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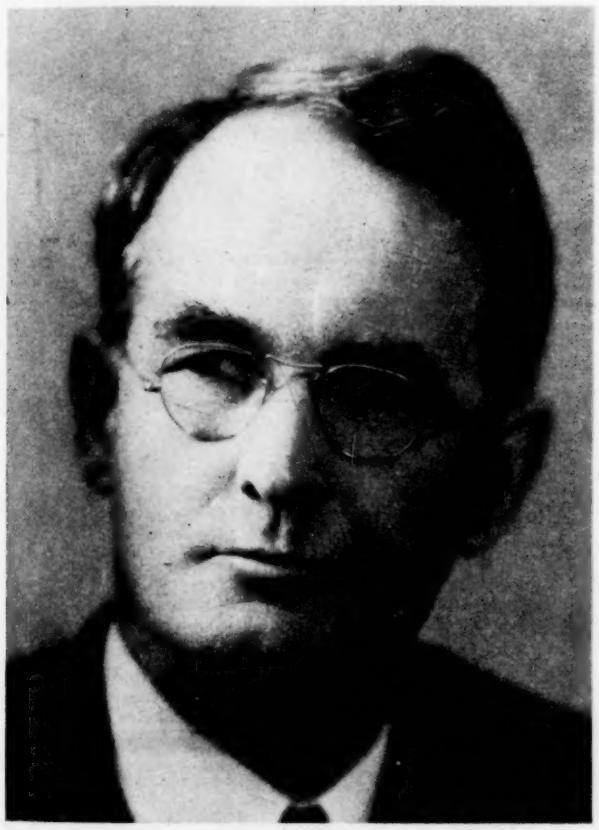
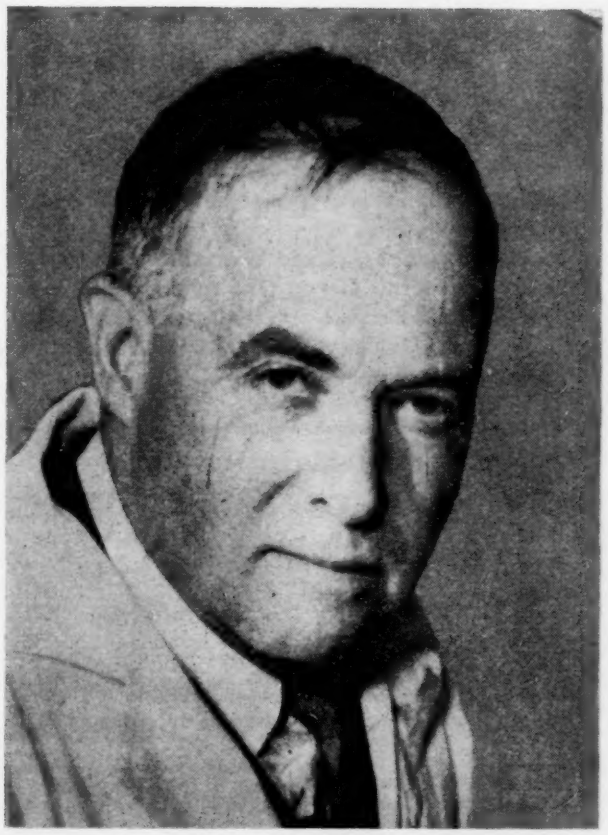
# SCIENCE



*(Photo by Bachrach)*

**P. W. Bridgman**
Named for the Nobel Prize in Physics, 1946



*(Courtesy Science Service)*

**J. B. Sumner**
Named for half the Nobel Award in Chemistry, 1946

These two men together with the other winners of this year's prizes—H. J. Muller, John H. Northrop and W. M. Stanley—will be honored at the annual Nobel Memorial Program on 10 December at the Waldorf-Astoria Hotel in New York. Similar recognition will come to them from Stockholm on that date where a simultaneous event will take place, falling this year on the fiftieth anniversary of Alfred Nobel's death.

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# SCIENCE

Vol. 104, No. 2710 Friday, 6 December 1946


## The Need for Ichthyological Surveys of the Major Rivers of Western North America[1]


**Robert R. Miller**

*U.S. National Museum, Smithsonian Institution, Washington, D.C.*


EXPLORATIONS OF THE COLORADO, Sacramento, and Columbia Rivers, the major drainages of western North America, have been made by adventurers and scientists for more than 100 years, yet the fish fauna of these basins, particularly of the Colorado and the Columbia, are still imperfectly or poorly known. The reason for this is apparent when one considers the magnitude of these rivers and the ruggedness of the terrain they cross.

A comparison of the known genera of fluvial fishes inhabiting these basins is given in Table 1, with the Klamath River included for convenience. The term fluvial is used for representatives strictly confined to fresh water, but a list of anadromous forms (*1*) appears at the end of the table. Thus, the Pacific salmon, *Oncorhynchus,* is omitted from the Sacramento and Klamath Rivers because no forms restricted to fresh water are known therein, although the genus is a member of the anadromous group in both of these drainages.

The need for surveys of the western rivers may be summarized briefly as follows:

(1) It is desirable to learn what kinds of native fishes inhabit the basins.

(2) At the same time, needed information on introduced species can be obtained.

(3) Surveys would yield a wealth of comparative material necessary for the solution of problems of speciation in fishes of the West and elsewhere.

(4) Data are needed to enable a critical appraisal of fish management problems created by the construction of dams and the haphazard introduction of alien species.

(5) It is past time to bring to bear the data of ichthyology on the problems of the Pleistocene histories of these rivers.

(6) Surveys are needed as an aid in interpreting the environment of archeological sites, particularly in the Southwest, through the collection and interpretation of fossils.

The need for these surveys is urgent because of changes caused by: (1) the effects of dams and diversions, water-power development, water storage, and irrigation practices; (2) pollution from mining operations; (3) destruction of vegetation by livestock resulting in increased floods and erosion (particularly serious in the Southwest); and (4) introduction of exotic species.

Water development is particularly critical. Postwar projects are planned for the construction of dams on a scale heretofore unparalleled in the West. In the Central Valley of California alone, no fewer than 23 new or enlarged reservoirs, 2 diversions (from the Klamath to the Sacramento Rivers—biological suicide), and 8 canals are proposed (*4*). The effects of these obstructions, diversions, and canals will be serious for the native fish fauna, as already demonstrated for the valuable fish resources of the Central Valley.

Up to 1915 there were in operation 7 diversions of waters from the Colorado basin,[2] 4 into the Bonneville and 3 into the Mississippi basins (*2*). In addition, 5 other diversions were planned at that time and, although only 3 reservoirs had been built, 47 were proposed. Of these, 5 have been constructed since, and 12 others have been built or are under construction, thereby bringing new problems to the aquatic life of the Colorado. The zoogeographical effects of these diversions and the changes wrought by the reservoirs have received only slight attention or none at all.

In the Columbia River basin the aberrant sucker, *Chasmistes,* is confined to Utah Lake (Bonneville basin), and *Deltistes,* the only endemic genus known from the Klamath system, is restricted to Klamath Lake, along with close relatives of *Chasmistes.* Elsewhere, the relict *Chasmistes* is known only from Pyramid Lake, in the interior drainage of the Lahontan basin, Nevada. Although the subgenus *Siboma* occurs in both the Sacramento and Columbia Rivers,


[1] Published by permission of the Secretary, Smithsonian Institution.

The author is grateful to Drs. Leonard P. Schultz and Carl L. Hubbs for assistance in preparation of Table 1.


[2] Not including the diversion into Imperial Valley, California, which does not involve problems in zoogeography.

it is known in the latter only from the Upper Snake and Bonneville basins. The representative of the genus *Couesius, C. greeni* Jordan, in the Columbia, has been discovered only in Lake Pend d'Oreille (Columbia River) and Stuart Lake (Fraser River). In the Colorado the record for *Couesius* (based on unknown from coastwise streams south of the Columbia but is present in the Fraser River; *Iotichthys* is a relict confined to the Bonneville basin; *Snyderichthys* (*3*) thus far has been found only in the Bonneville basin and Little Wood River, a tributary of the Snake River; and *Oregonichthys* is restricted to the Willa-

TABLE 1

COMPARISON OF THE FLUVIAL FISH FAUNA OF FOUR RIVERS OF WESTERN NORTH AMERICA
(Genera in bold face are restricted to the basin indicated.)

| Family | Colorado River[1] | Sacramento River[2] | Klamath River | Columbia River[3] |
|---|---|---|---|---|
| Petromyzonidae | ..... | *Entosphenus* | *Entosphenus* | ..... |
| (Lampreys) | ..... | *Lampetra* | ..... | *Lampetra* |
| Coregonidae | *Prosopium* | ..... | ..... | *Prosopium* |
| (Whitefishes) | ..... | ..... | ..... | *Leucichthys*[4] |
| Salmonidae | *Salmo* | *Salmo* | *Salmo* | *Salmo* |
| (Trouts) | ..... | ..... | ..... | *Oncorhynchus* |
| | ..... | *Salvelinus* | *Salvelinus*[5] | *Salvelinus* |
| Catostomidae | *Catostomus* | *Catostomus* | *Catostomus* | *Catostomus* |
| (Suckers) | *Pantosteus* | *Pantosteus*?[6] | ..... | *Pantosteus* |
| | ..... | ..... | *Chasmistes* | *Chasmistes* |
| | **Xyrauchen** | ..... | ..... | ..... |
| | ..... | ..... | **Deltistes** | ..... |
| Cyprinidae | **New genus** | *Ptychocheilus* | ..... | *Ptychocheilus* |
| (Minnows) | *Gila (Gila)* | *Gila (Siboma)* | *Gila (Klamathella)* | *Gila (Siboma)* |
| | *Rhinichthys* | *Rhinichthys* | *Rhinichthys* | *Rhinichthys* |
| | ..... | *Siphateles* | *Siphateles* | *Siphateles* |
| | *Couesius*? (see text) | ..... | ..... | *Couesius* |
| | *Agosia* | ..... | ..... | ..... |
| | **Tiaroga** | ..... | ..... | ..... |
| | **Meda** | ..... | ..... | ..... |
| | **Lepidomeda** | ..... | ..... | ..... |
| | **Plagopterus** | ..... | ..... | ..... |
| | **New genus** | ..... | ..... | ..... |
| | ..... | **Mylopharodon** | ..... | ..... |
| | ..... | **Orthodon** | ..... | ..... |
| | ..... | **Hesperoleucus**[7] | ..... | ..... |
| | ..... | **Lavinia** | ..... | ..... |
| | ..... | **Pogonichthys** | ..... | ..... |
| | ..... | ..... | ..... | *Richardsonius* |
| | ..... | ..... | ..... | **Iotichthys**[8] |
| | ..... | ..... | ..... | **Acrocheilus** |

[1] Including the Pleistocene tributary White River of eastern Nevada.
[2] Including the Pleistocene connectives: Russian, Gualala, and Navarro Rivers; San Francisco Bay streams; and Pajaro-Salinas basin.
[3] Including the Snake River and the Pleistocene connectives: Fraser and Umpqua Rivers, Puget Sound, Malheur and Bonneville basins.
[4] *L. gemmifer*, a glacial relict confined to Bear Lake, Bonneville basin.
[5] Now extinct in the Klamath basin.
[6] Perhaps introduced (Feather River drainage).
[7] Known also from a tributary of the Warner Lakes basin of southeastern Oregon.
[8] Known only from the Bonneville basin in Utah.

*Ceratichthys squamilentus* Cope) is open to question, for the species has not been taken since the capture of the type in 1870. *Tiaroga* and *Meda,* of the Colorado, are restricted to the Gila River basin, and *Lepidomeda* is known only from the Middle Colorado (basin of Pleistocene White River, Meadow Valley Wash, Virgin River, and Little Colorado River). *Meda* and *Lepidomeda,* together with *Plagopterus* (also of the Colorado), form a unique subfamily of cyprinids, the Plagopterinae, which constitutes the only group of spined minnows in the New World. Of the peculiar cyprinids of the Columbia, *Mylocheilus* is

mette and Umpqua Rivers, Oregon. *Columbia,*[3] *Novumbra,* and *Archoplites* are survivors of an ancient fauna which probably antedated the barrier of the Rocky Mountains.

The known fish fauna of these rivers therefore comprises a large number of relicts, many of which are of restricted distribution or are rare. Others have be-

[3] G. Whitley (*Austral. Nat.*, May 1940, p. 243) claimed that *Columbia* was preoccupied by *Columbia* Rang and erected *Columatilla* to replace it. H. A. Rehder, associate curator of Molluscs, U. S. National Museum, kindly checked the reference and found that Rang's name is spelled *Colombia* (spelling and citation correctly given by Neave). *Columatilla* Whitley therefore falls as a synonym of *Columbia* Eigenmann.

come greatly reduced since the turn of the century by processes already described. The rest of the fauna can be divided into (1) marine derivatives: *Entosphenus, Lampetra, Salmo, Oncorhynchus, Salvelinus, Hysterocarpus,* and *Lota*; (2) widespread genera: *Prosopium, Leucichthys, Catostomus, Pantosteus, Rhinichthys, Cyprinodon,* and *Cottus*; and (3) genera restricted to Western North America: *Chasmistes, Ptychocheilus, Gila, Siphateles, Agosia, Richardsonius,* and *Poeciliopsis*[4] (in addition to those in bold face, Table 1). The percentage of the fluvial genera confined to each of the major basins is as follows: Colorado River—19 genera, 8 endemic, 42 per cent; Sacramento River—18 genera, 7 endemic, 39 per cent; Columbia River—25 genera, 8 endemic, 32 per cent. These figures are probably least accurate for the Columbia, as this is the largest basin, and most accurate for the much smaller and better-known Sacramento.

[4] *Poeciliopsis* occurs in Pacific streams from Arizona to Colombia.

Of the known genera of the West with strictly fluvial members, 31 out of 45, or 69 per cent, are confined thereto.[5] Only 12, or 27 per cent, of the genera also occur east of the Rockies, and 6, or 13 per cent, occur on both sides of the North Pacific.

The factors responsible for changes which have already strongly affected the endemic fish fauna of the Western rivers continue to operate and will very likely be accelerated in the next decade. In time, therefore, a clear picture of the original fauna may no longer be obtainable, and consequently the surveys should be undertaken as soon as possible.

TABLE 1 (*continued*)

COMPARISON OF THE FLUVIAL FISH FAUNA OF FOUR RIVERS OF WESTERN NORTH AMERICA
(Genera in bold face are restricted to the basin indicated.)

| Family | Colorado River | Sacramento River | Klamath River | Columbia River |
|---|---|---|---|---|
| | ..... | ..... | ..... | **Mylocheilus** |
| | ..... | ..... | ..... | **Oregonichthys**[9] |
| | ..... | ..... | ..... | **Snyderichthys** |
| | ..... | ..... | ..... | **New genus** |
| Novumbridae (Mud-minnows) | ..... | ..... | ..... | **Novumbra**[10] |
| Cyprinodontidae (Killifishes) | *Cyprinodon* | ..... | ..... | ..... |
| | **Crenichthys**[11] | ..... | ..... | ..... |
| Poeciliidae (Top-minnows) | *Poeciliopsis* | ..... | ..... | ..... |
| Percopsidae (Trout-perches) | ..... | ..... | ..... | **Columbia**[12] |
| Centrarchidae (Sunfishes) | ..... | **Archoplites**[13] | ..... | ..... |
| Embiotocidae (Surf-perches) | ..... | **Hysterocarpus**[14] | ..... | ..... |
| Gadidae (Cods) | ..... | ..... | ..... | *Lota*[14] |
| Cottidae (Sculpins) | *Cottus* | *Cottus* | *Cottus* | *Cottus* |
| Anadromous forms: | | | | |
| Petromyzonidae (Lampreys) | ..... | *Entosphenus* | *Entosphenus* | *Entosphenus* |
| | ..... | *Lampetra* | ..... | *Lampetra* |
| Acipenseridae (Sturgeons) | ..... | *Acipenser* | *Acipenser* | *Acipenser* |
| Salmonidae (Trouts) | ..... | *Salmo* | *Salmo* | *Salmo* |
| | ..... | *Oncorhynchus* | *Oncorhynchus* | *Oncorhynchus* |
| | ..... | ..... | ..... | *Salvelinus* |
| Osmeridae (Smelts) | ..... | *Spirinchus* | ..... | *Spirinchus* |
| | ..... | ..... | *Thaleichthys* | *Thaleichthys* |

[9] *O. cumingii* (Günther), described from "California," is of very uncertain status.
[10] This family and its only known genus and species, *Novumbra hubbsi* Schultz, constitutes a rare relict found only in the Chehalis River basin at and near Satsop, Washington (Puget Sound drainage).
[11] A relict inhabiting the basin of Pleistocene White River and the adjacent Railroad Valley, Nevada.
[12] The only trout-perch west of the Rocky Mountains. *Columatilla* Whitley is a synonym; see text.
[13] This relict is the only native sunfish west of the Rocky Mountains.
[14] The only known fresh-water representative of the marine family.

[5] Including *Pantosteus delphinus jordani* and *Gila nigrescens,* which have spilled over into the headwaters of the Missouri and the Río Grande, respectively.

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# Theory and Prediction in Science

**Rudolf Carnap**

*Department of Philosophy, University of Chicago*

THE ACTIVITY OF THE SCIENTIST is twofold: he observes events, and he constructs laws intended to explain the facts observed. These two activities are closely interconnected. We do not first accumulate isolated facts and only then start looking for laws to explain them. It is true, we consider the results of previous observations when we hypothetically set up a law. But on the other hand, in collecting our observational data and especially in choosing suitable experimental arrangements, we are guided by at least a rudimentary system of laws, even if it is merely a vague guess at a regularity or correlation.

Similar to the relation between observed facts and experimental laws is the relation between these laws and others of a wider generality and a higher degree of abstraction. The abstract laws are based upon the experimental laws; but in laying down an experimental law we take into consideration not only observational results but also more general laws already available or anticipated. Finally, we try to construct a theory as an integrated system of laws of different levels of generality and abstraction. The development of science proceeds simultaneously in both directions: more and more observational results are collected with regard to, and with the help of, theories; and theories are constructed and modified with regard to observed facts.

From the purely theoretical point of view, the construction of a *theory* is the end and goal of science. When we are interested, on the other hand, in the practical application of science, we ask for *predictions*. We want to obtain knowledge, or at least a reasonable conjecture, as to what events we may expect. This is indispensable as a basis for reasonable decisions in practical activities. However, predictions are necessary not only for the practical application but also for purely theoretical purposes. In order to test a theory we derive predictions with its help; then we observe whether and to what extent the facts bear out the predictions, and these results are taken as the basis for our judgment of the theory.

There are some important issues in the methodology of science receiving at present much discussion by scientists and philosophers which center around this problem of the relation between a theory and observed facts. All agree today in rejecting the view prevalent in the 19th Century that a law or theory is inferred from facts by induction. We may still speak of inductive inference, since it is customary to do so; but if we do, we should keep in mind that our meaning is not that of the 19th Century. We all agree (1) that there is not in inductive inference the certainty there is in deductive inference, and (2) that there are no fixed rules which lead, so to speak, mechanically from a given body of facts to a theory. The theory is not *discovered* by a wholly rational or regulated procedure; in addition to knowledge of the relevant facts and to experience in working with other theories such nonrational factors as intuition or the inspiration of genius play a decisive role. Of course, once the theory is proposed, there may be a rational procedure for *examining* it. Thus it becomes clear that the relation between a theory and the observational evidence available is, strictly speaking, not that of *inferring* the one from the other but rather that of *judging* the theory on the basis of the evidence when both are given.

A similar problem exists with regard to the relation between the prediction of a future event and the observational evidence available at the present time. Here, likewise, the question is, strictly speaking, not one of *inferring* the prediction from the evidence but rather of *judging* the reliability or strength of the given prediction with respect to the given evidence. This problem is similar to that concerning a theory but there are also some differences. Some believe that with respect to the evidence at hand, our primary judgments concern the reliability of theories, and that judgments as to the reliability of predictions of single events are derivative, in the sense that they depend upon the reliability of the theories used in making the predictions. Others believe that judgments about predictions are primary, and that the reliability of a theory cannot mean anything else than the reliability of the predictions to which the theory leads. And according to a third view, there is a general concept of the reliability of an hypothesis of any form with respect to given evidence. Theories and singular predictions are in this case regarded as merely two special kinds of hypotheses.

Instead of the term 'reliability,' other terms are sometimes used with regard to either theories or predictions—for instance, 'probability,' 'weight,' 'strength,' 'degree of confirmation,' etc. I shall continue deliberately to use the vague and somewhat ambiguous term 'reliability' in order to leave open the still controversial question as to the nature of the concept here involved, which might be prejudged by the choice of one of the more specific terms.

Let me now briefly outline some of the problems

**Opening remarks at the meeting of Section L, AAAS, St. Louis, 28 March 1946.**

concerning the task of judging, on the basis of given observational evidence, the reliability of an hypothesis, which may be either a theory, a prediction, or perhaps a statement of still another form. I shall briefly outline the controversial issues, since it is not possible to explain here the reasons for the various views.

The first question is whether there is any rational and objective procedure at all for judging the reliability of hypotheses—any procedure objective in the sense of not being dependent on personal whim or bias. If there are inductive judgments in this sense, then there arises the question: What is their form? They may be merely comparative, stating, for instance, that the available evidence gives stronger support to the one than to the other of two given, incompatible hypotheses, or that a given hypothesis is supported more by the one than by the other of two bodies of evidence. But can we go beyond mere comparison and make quantitative inductive judgments attributing a numerical value to the reliability of an hypothesis? This is one of the most controversial issues. Some believe that this is not possible (e.g. von Mises, *10*). Others, such as Keynes (*8*), Koopman (*9*), and Nagel (*11*), regard it as possible within a special, narrowly limited domain—for instance, for the prediction of a result in a game of chance. Still others, including Jeffreys (*7*), Carnap (*1*), and Helmer, Hempel, and Oppenheim (*5, 6*), think that quantitative judgments are possible in a wide field, or even for hypotheses of any kind.

Thus, even the form of inductive judgments about the reliability of hypotheses is under debate. Still more controversial are the problems of the nature and meaning of these judgments. What precisely is meant by 'reliability,' 'probability,' or 'degree of confirmation'? By what method can we obtain inductive judgments? What is the foundation of their validity?

Some authors think that the concept of the reliability of an hypothesis (called 'probability' or 'weight') must be based upon, or even identified with, the statistical concept of probability—that is, relative frequency within an infinite sequence (Reichenbach, *14*). Therefore, an inductive judgment about an hypothesis is here regarded as empirical. Related to this view are the modern methods of mathematical statistics, which are likewise based upon the frequency conception of probability (especially those of R. A. Fisher, *3, 4*, and Neyman and Pearson, *12, 13*; for a brief survey see Wald, *15*). Here we find different forms of inductive judgments; the hypotheses to be judged are usually statistical hypotheses concerning the distribution of properties or of values of physical magnitudes within a given domain. The weakest judgments express merely the acceptance or rejection of the given hypothesis on the basis of the given evidence. Stronger methods have been developed which yield an estimate for the value of a parameter occurring in a given statistical hypothesis. Some statisticians apply a numerical concept of reliability to a special kind of statistical hypotheses (Fisher's 'fiducial probability').

Finally, there are students who regard the concept of the reliability of an hypothesis (called by some 'probability' and by others 'degree of confirmation') as a purely logical concept; therefore, the inductive judgments are here not empirical but analytic, similar to the deductive judgment saying that a given conclusion follows logically from given premises. Some adherents of this conception, such as Keynes (*8*), and Koopman (*9*), restrict the inductive judgments entirely or chiefly to the comparative form, while others, such as Jeffreys (*7*), admit quantitative judgments in a wider field. Recently, attempts have been made at an explicit definition of a quantitative concept of reliability ('degree of confirmation') applicable to hypotheses of any form expressible in a certain simple language (Carnap, *1*, and Helmer, Hempel, and Oppenheim, *5, 6*).

All these various approaches to the problem of inductive judgments of theories, predictions, or other hypotheses are still in a state of development. In particular, the question as to the relations of the different methods to one another is still under debate. Sometimes adherents of one method regard the other methods as unsound. But there are others, and I am among them, who believe that the various approaches are not incompatible but supplementary to each other (*2*). Further clarification of the nature of each method and its relation to the other methods is required.

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# A Focus of Sylvatic Plague on the Peruvian-Ecuadorian Frontier[1]

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SYLVATIC PLAGUE IS KNOWN TO EXIST in many parts of the world, especially in Manchuria, in South Africa, and on the North American continent. In South America what appears to be true sylvatic plague has been reported only from Argentina (*1, 2*). The importance of sylvatic plague in epidemiology, especially in explaining the sequence and persistence of plague infection in certain areas, makes it appear worth while to present this report of a new focus of sylvatic plague in South America.

Miño (*3*) and Sáenz Vera (*4*) declared that the plague which has been observed since 1918 in the frontier regions of Peru and Ecuador is strictly rural, without the characteristics of sylvatic plague. In May 1946 there began extensive epizootics on both sides of the frontier of these countries, at Bolasbamba, Cerro Negro, and Alamor, in Ecuador, and at Encuentros and neighboring areas, in the District of Lancones, Province of Sullana, Department of Piura, Peru. Our investigations were made in the Encuentros zone, from the Ecuadorian border (4°11′53″2 S.) south to approximately 4°30′ S., and from the Quebrada de Pilares to the Ecuadorian zone of Cazaderos. The terrain is mountainous, ranging in altitude from 600 to 700 meters, with small permanent rivers.

The principal focus of sylvatic plague found is located on the mountains, La Mesa and Cortezo, both of which are covered with dense vegetation consisting of large trees; the climate of this area is continental, hot in the daytime and cool at night (30°–15° C.). Small scattered fields have been cleared on the tops and slopes of these mountains for the cultivation of corn.

The chief findings which in our opinion warrant the classification of this plague focus as one of sylvatic plague are the following:

(1) There was a complete absence of domestic rats, *Rattus rattus rattus, R. rattus alexandrinus,* and *R. norvegicus,* and of the fleas of domestic rats, *Xenopsylla cheopis* and *Ceratophyllus londiniensis,* these being the only species of rats and fleas involved in plague transmission in the rest of the country.

(2) The region is very sparsely populated, with small rural settlements and scattered dwellings. Among these there occurred 19 human cases of bubonic plague; but epidemiological investigation did not bring to light any domestic factors to explain the local outbreak. On the other hand, we were able to confirm that nearly all of the patients had become infected with plague in the cornfields on the mountains specified, during the harvesting of the corn crop.

(3) There was an intense epizootic among squirrels and native field rats which inhabit the rocky gorges and the wooded areas, especially on the slopes and higher parts of the mountains.

(4) The following animals were found infected with plague in the woods of the region: (a) a black squirrel; (b) a lot of seven brown squirrels, tissues from which were pooled and inoculated into guinea pigs; (c) five rats which were found dead in the wooded areas bordering the cornfields; in this group were two distinct species of native field rats.

(5) Many mites, ticks, lice, and fleas were found on these squirrels and rats. The fleas were all of the genus *Rhopalopsyllus,* though possibly of more than one species. These fleas live away from their animal hosts in the cornfields, and we collected many on our clothing during our investigations in these fields.

(6) At least two species of mice, four of rats, and two of squirrels were collected, and these, with their ectoparasites, are now being classified. One of the rat species is *Akodon mollis.* None of the species found has been involved in plague elsewhere in Peru.

In summary, the plague outbreak observed at Encuentros, Department of Piura, Peru, fulfills the requisites which permit of its designation as sylvatic plague—that is, its occurrence independent of domestic rat infection, its appearance among wild rodents, the absence of fleas other than those of the wild rodents, and the occurrence of human cases of plague which were infected in the same areas where plague epizootic among the native wild rodents was found.

Studies are in progress of the reservoirs of the plague infection, of experimental transmission of the infection with the ectoparasites collected, of the experimental susceptibility to plague of the local rodents, and of the epidemiology and extent of the focus of sylvatic plague.

[1] This study was made in cooperation with the Department of Plague of the Ministry of Public Health and Social Assistance of Peru and was assisted in part by a grant-in-aid from the Office of Inter-American Affairs.

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# Program

## One Hundred Thirteenth Meeting

## American Association for the Advancement of Science

Boston, 26-31 December 1946

### General Sessions

At the opening session of the Association, to be held on Thursday evening, 26 December, commencing at 8:15 in Boston Symphony Hall, Charles F. Kettering, director of the Research Laboratories, General Motors Corporation, will present the retiring presidential address on "A Look at the Future of Science." Immediately following this address a general reception will be given by officers of the Association on behalf of the local committees for members and registered guests. It is expected that many distinguished scientists will be present at this session, including the presidents and prominent faculty members of universities and colleges in the Boston area, as well as visiting scientists from leading institutions and organizations throughout the United States who will be in Boston to participate in the programs of the more than 55 sections and societies meeting with the Association.

On Friday morning and afternoon, 27 December, the Association is sponsoring a General Technical Session dealing with special research programs and projects under the direction of the Army and Navy. The morning session will be devoted largely to the discussion of Navy research activities, including work on nuclear physics and a summary of the "Operation Crossroads." Vice-Admirals Harold G. Bowen and W. H. P. Blandy are to be among the principal speakers. At the same session Lt. Col. Carl Reichert, Wright Field, will speak on "General Trends in the Design of Military Aircraft," followed by a discussion of "Human Requirements for the Design of Supersonic Aircraft," by Lt. Col. A. P. Gagge, Wright Field. In the afternoon Maj. Gen. Curtis E. LeMay and Brig. Gen. Malcome C. Groves, U. S. Army Air Forces, will discuss, respectively, the "Air Force Research and Development Program" and "Future Research in Aviation Medicine." Marshall H. Stone, of the University of Chicago, will follow with an address on "Science and Statecraft." Among the papers also to be presented during this session will be "Theoretical Analysis of Ducted Fan Turbo-Jet Engines," "Suppression of Radiations at High Temperatures by Means of Ceramic Coatings," and "Human Engineering."

On Saturday morning and afternoon, 28 December, the Committee on the Scientific Policy of the AAAS will sponsor a round-table discussion on "Science and the Public." Participants include: Howard W. Blakeslee, Associated Press; Lyman Bryson, Counselor on Public Affairs, Columbia Broadcasting System; Ralph W. Gerard, professor of physiology, University of Chicago; R. Likert, director, Survey Research Center, University of Michigan; Marion C. Manly, president, New Jersey Library Association; Albert E. Parr, director, American Museum of Natural History; Theodore Smith, Motion Picture Association of America; and Gerald Wendt, editorial director, *Science Illustrated.*

In the afternoon also, the National Geographic Society will present Matthew W. Stirling, chief of the Bureau of American Ethnology, and Mrs. Stirling, in an illustrated lecture on "Archeological Studies of Pre-Columbian Culture in Southern Mexico." Colored movies will illustrate the lecture, to be given in Boston Symphony Hall.

On Saturday evening the United Chapters of Phi Beta Kappa will present a 10th annual lecture in the Oval Room of the Bradford Hotel. Theodore Spencer, professor of English, Harvard University, will speak on "Science and the Poet."

On Monday evening, 30 December, C. B. Fawcett, of London, England, will present an address on "The Numbers and Distribution of Mankind." This lecture, the third British and American Association exchange lecture, will be presented at 8:15 in Sanders Theater, Harvard University.

### Special Sessions

#### AAAS–George Westinghouse Science Writing Award

At a luncheon on Friday, 27 December, the George Westinghouse Science Writing Award of $1,000 will be presented, with a citation, to a science writer for distinguished science reporting. The winning entry has been selected by a judging panel of six persons chosen to represent newspapermen, scientists, and the general public. Announcement of the winner will be made at the luncheon, which is open to admission by card only. Those wanting cards must communicate with W. L. Valentine, 1515 Massachusetts Avenue, Washington, D. C.

#### State Academy Delegates

The annual meeting of the Academy Conference, to be attended by delegates from the affiliated state academies, will be held at 4:00 P.M., on 27 December, in the Statler Hotel. At 6:00 P.M. the delegates are invited to attend a dinner given by the AAAS.

### Annual Sigma Xi Address

On Sunday evening, 29 December, Harlow Shapley, director of the Harvard Observatory, will address a joint meeting of the Society of the Sigma Xi and the American Astronomical Society. Dr. Shapley's address, on "Goals of International Science," will be presented at 8:15 in Sanders Theater, Harvard University, Cambridge.

### American Institute of Biological Sciences

On Sunday also, biologists will assemble at 2:00 P.M. in the Georgian Room of the Statler Hotel for an open discussion of the projected American Institute of Biological Sciences, Robert Chambers presiding.

### American Association of Scientific Workers

On Monday, 30 December, the American Association of Scientific Workers will present a symposium on "A National Science Foundation." This session will open at 2:00 P.M. in the Ballroom of the Copley-Plaza Hotel. The essential aspects of the National Science Foundation, with particular reference to the nature, extent, direction, and utility of pure and applied science in this country, will be discussed. Reference will be made to the Nuclear Physics Institute and relations between the Army and Navy and educational and research institutions.

## Entertainment

In addition to the general reception given on Friday evening, 27 December, a symphony concert will be presented at 4:30 P.M. on Sunday, 29 December, in the Opera House, Arthur Fiedler conducting. In the evening, starting at 8:30, the Harvard Glee Club will give a concert in the Fogg Art Museum at Harvard University. Complimentary tickets for both functions will be furnished on request to registering members and guests.

Women scientists and wives of the members of the Association and their guests are invited to inspect the Isabella Stuart Gardner Museum, located at 280 Fenway, on Saturday, 28 December, between 2:00 and 4:00 P.M. Tea will be served at Simmons College, next door to the Gardner Museum, between 4:00 and 6:00 P.M.

## Hotel Headquarters

*General Headquarters*: The Statler Hotel will serve as the general headquarters of the Association, housing the Press Room (Parlor F) and the business meetings of the Association.

Headquarters of the sections and committees of the Association and of the societies meeting with the Association in Boston are as follows:

*Statler Hotel*: Section on Medical Sciences (N), Subsections on Dentistry (Nd) and Pharmacy (Np); Academy Conference, American Dietetic Association, American Microscopical Society, American Society of Naturalists, American Society of Parasitologists, American Society of Zoologists, Genetics Society of America, Ecological Society of America, Limnological Society of America, National Association of Science Writers, Sigma Delta Epsilon, Society for the Study of Evolution, Society of the Sigma Xi, United Chapters of the Phi Beta Kappa.

*Bradford Hotel*: Sections on Psychology (I) and Education (Q); American Nature Study Society, Committee on Scientific Policy of the AAAS, Cooperative Committee on Science Teaching of the AAAS, National Association of Biology Teachers, National Science Teachers Association, Pi Lambda Theta, Society for Research in Child Development.

*Commander Hotel*: Sections on Astronomy (D) and Geology and Geography (E); American Astronomical Society, American Geological Society, American Meteorological Society. (Meetings of these sections and societies will be held at Harvard University.)

*Copley-Plaza Hotel*: Section on Botanical Sciences (G); American Fern Society, American Society for Horticultural Science, American Society of Plant Physiologists, American Society of Plant Taxonomists, Botanical Society of America, Mycological Society of America, Phi Sigma Biological Society, Sullivant Moss Society.

*Kenmore Hotel*: Sections on Chemistry (C), Anthropology (H), Social and Economic Sciences (K), History and Philosophy of Science (L), and Engineering (M); American Philosophical Association, American Statistical Association, History of Science Society, Institute of Mathematical Statistics, Philosophy of Science Association, Pi Gamma Mu. (Sections C and M will meet in Building 10 of the Massachusetts Institute of Technology.)

## Registration

The main registration desks will be found at the Exposition Hall, located in the First Corps Cadet Armory, corner of Arlington Street and Columbus Avenue. The Armory is situated diagonally across the intersection from the Statler Hotel, general headquarters for the Convention.

The entrance to the Exposition Hall is on Arlington Street. Registration will commence at 10:00 A.M. on Thursday and at 9:00 A.M. on subsequent days, including Sunday. The Exposition Hall will close at 5:30 P.M. daily, except on Tuesday, the final day of the Convention, when closing time will be 11:30 A.M.

Subsidiary registration desks will be situated in the Bradford, Continental, Copley-Plaza, Kenmore, and Statler hotels and will be open from 6:30 to 9:00 P.M. on Thursday, 26 December, through Saturday, 28 December. Registration desks will also be open at the following places: Institute of Geographical Exploration, Friday, Saturday, and Monday, 27, 28, and 30 December, 9:00 A.M. to 5:00 P.M.; Soden Building, Boston University, 84 Exeter Street, Boston, Friday and Saturday, 27–28 December, 9:00 A.M. to 5:00 P.M.; Massachusetts Institute of Technology, Building 10, Thursday, 26 December, 12:30 P.M. to 6:00 P.M., and Friday and Monday, 27 and 30 December, 9:00 A.M. to 5:00 P.M.

The registration fee is $2.00. All members and visitors are urged to register since admittance to certain general sessions and functions will be contingent on display of a Convention Badge. Information called for on the registration cards distributed about the registration desks should be filled in carefully and the cards presented at the registration booths. Registrants will receive the General Program, containing programs of all sections and societies meeting with the Association, and the AAAS Convention Badge, as well as maps and pamphlets of meeting sites and historic points of interest in and about Boston. The names and local addresses of persons registering will be listed in the Visible Directory at the Registration Center. The Directory serves to bring acquaintances together and to facilitate the delivery of mail, telegrams, and important messages.

*Copies of the General Program are now ready* for distribution and may be obtained in advance of the meetings by writing to the office of the Administrative Assistant, AAAS, 1515 Massachusetts Avenue, N.W., Washington 5, D. C. A check for $2.00 should be enclosed with each order. A Convention Badge and registration card will be included with the copy of the General Program. Upon arriving in Boston, please present this card at the Registration Center for inclusion in the Visible Directory.

## Programs of Sections

### (A) Mathematics

The Section on Mathematics will not meet with the Association in Boston. However, Marshall H. Stone, of the University of Chicago, will present a retiring vice-presidential address at the afternoon meeting of the General Technical Session. Dr. Stone was vice-president of the Section in 1942.

### (B) Physics

The Section on Physics is sponsoring a joint symposium on "The Shortage of Scientific Personnel" with the Sections on Psychology (I), Social and Economic Sciences (K), and Education (Q) on Saturday morning and afternoon, 28 December, in the Ballroom Foyer of the Copley-Plaza Hotel. On Saturday evening it is participating with these same sections in a symposium on "Science Legislation and the Problems of Federal Aid," and on Monday morning Section B is co-sponsoring a symposium on "The Gaseous Envelope of the Earth" with the American Astronomical Society, American Meteorological Society, and the Section on Astronomy (D).

### (C) Chemistry

All meetings of the Section on Chemistry will be held in Room 250 of Building 10, located on the campus of the Massachusetts Institute of Technology. A list of contributed papers will be presented on Thursday afternoon and evening and on Friday morning, 26–27 December, including among other titles: "Physical Chemistry of Rockets"; "Permanent Waving of Human Hair—The Cold Process"; "Histamine and Antihistaminic Substances"; and "The Use of Ion Exchangers for the Determination of Physical Chemical Properties of Substances, Particularly Radio Tracers in Solutions." At the Friday afternoon session, Henry Eyring will present the retiring vice-presidential address of the Section, speaking on "The Present Status of the Reaction Rate Theory." The remainder of this session will be devoted to papers on the kinetics of reaction systems.

### (D) Astronomy

Section D will meet jointly with the American Astronomical Society for eight sessions, from Friday, 27 December, to Monday, 30 December, inclusive. The meetings will be held at Longfellow Hall, Radcliffe College, the Harvard Observatory, and Sanders Theater. The address of the retiring vice-president, J. J. Nassau, will be given at Longfellow Hall on the afternoon of Friday, 27 December.

### (E) Geology and Geography

Section E will meet jointly with the Geological Society of America on Monday and Tuesday, 30–31 December. All meetings will be held in the Institute of Geographic Exploration, Harvard University. A symposium on "New England State Geological Surveys" will be given Monday morning and will be followed in the afternoon by a symposium on "New England Geology." At the Tuesday morning conference on training in geology, Arthur C. Bevan will present the address of the retiring vice-president of the Section. The title of his address will be "Whither Geology?" A symposium on "Synthesis of Single Crystals" will constitute the afternoon program.

### (F) Zoological Sciences

The Section on Zoological Sciences has no formal program of its own this year other than the annual business meeting at 12:00 noon in the Salle Moderne Room of the Statler Hotel.

### (G) Botanical Sciences

The Section on Botanical Sciences will hold a joint session with individual botanical societies on Friday afternoon in the Ballroom of the Copley-Plaza Hotel. Elvin C. Stakman, vice-president of the Section, will address the session on "The Nature and Importance of Physiologic Specialization in Phytopathogenic Fungi." A symposium on the "Proposed Plan for a Union Involving Workers in the Biological Sciences" will follow this address. The speakers at this symposium will include: Paul J. Kramer, Duke University; H. B. Tukey, Michigan State College; Ralph E. Cleland, Indiana University; and Robert F. Griggs, George Washington University. An open discussion will follow.

### (H) Anthropology

The Section on Anthropology will meet in the Embassy Room of the Kenmore Hotel on Thursday afternoon and Friday morning. Titles from among the contributed papers include: "Statistical Analysis of Petroglyphs in California"; "Use of Serological Factors, Especially the Genes of Physical Anthropology"; "The Integration of Two Northwest Coast Ideas in a Myth of the Middle Fraser"; "Land as Property Among the Havasupae Indians"; and "Cultural Norms and the Individual in the Institutions of Nonliterate People."

### (I) Psychology

The Section on Psychology will meet in a two-day session on Saturday and Sunday, 28–29 December. The morning and afternoon sessions will be held in the Oval Room of the Bradford Hotel and will include papers on factors influencing the intelligibility of speech, vision testing in industry, behavior patterns, intellectual levels in mental disorders, memory changes following electroconvulsive therapy, learning rates, and principles of learning. Concurrently with the Saturday morning and afternoon sessions, Section I will participate in a joint symposium with the Sections on Physics (B), Social and Economic Sciences (K), and Education (Q) on "The Shortage of Scientific Personnel." These sessions will be held in the Ballroom Foyer of the Copley-Plaza Hotel. On Saturday evening, these sections will join in a symposium on "Science Legislation and Problems of Federal Aid," to be held in the Sheraton Room of the Copley-Plaza Hotel. Sections I and Q will also meet in a joint session in the Lobby Ballroom of the Bradford Hotel on Saturday evening. Sidney L. Pressey will present the retiring vice-presidential address of the Section on Psychology, entitled "'Efficiency Engineering' in the Present Educational Emergency." He will be followed by Guy T. Buswell, who will present the retiring vice-presidential address of the Section on Education. Dr. Buswell will speak on "Perceptual Research and Methods of Learning."

### (K) Social and Economic Sciences

The program of Section K will be of particular interest to all scientists. The opening session in the Ballroom Foyer of the Copley-Plaza Hotel on Friday morning, 27 December, is a symposium on "Economic Research and Technical Developments in New England." After participating in a joint luncheon with Pi Gamma Mu, National Social Honor Society, members and guests will return to the Ballroom Foyer, where Section K is joining the Academy of World Economics, the Industrial College of the Armed Forces, and Pi Gamma Mu in the presentation of a symposium on "Aspects of the Internal Structure and Present International Relations of the United States." Frederick C. Mills, vice-president of Section K, will speak on "Technological Gains and Their Incidence: A Review of Some Recent Economic Changes." Following Dr. Mills' lecture, papers will be presented by Benjamin H. Williams, on "Some Effects of International Disorganization on the Structure of the Political State," and Seymour E. Harris, on "The Effects of International Disorganization on the National Economy." A general discussion will follow. On Saturday morning and afternoon, 28 December, Section K will sponsor a symposium on "The Shortage of Scientific Personnel" with the Sections on Physics (B), Psychology (I), Education (Q), and Pi Gamma Mu. H. A. Moe will speak on "The Importance of the Problem"; M. H. Trytten, on "The Supply of and Demand for Scientific Personnel"; J. D. Kingsly, on "What the Government Is Doing About the Problem"; F. J. Brown, on "What the Universities Are Doing About the Problem"; and Kenneth A. Mead, on "What Industry Is Doing About the Problem." The afternoon session will conclude with a forum on "Next Steps Which Should Be Taken." Participants in this forum include: A. J. Allen, Westinghouse graduate professor of engineering; Leonard Carmichael, president of Tufts College; Francis Perkins, commissioner, U. S. Civil Service; M. H. Trytten, director, Office of Scientific Personnel, National Research Council; and Donald Young, executive director, Social Science Research Council. A symposium on "Science Legislation and Problems of Federal Aid" will be co-sponsored by the Sections on Social and Economic Sciences, Physics, Psychology,

Education, and Pi Gamma Mu on Saturday evening, 28 December. Speakers will include: E. U. Condon, Director, National Bureau of Standards; Talcott Parsons, chairman, Department of Social Relations, Harvard University; and Alfred E. Cohn, Rockefeller Institute for Medical Research. Robert M. Yerkes, of Yale University, will preside. On Sunday afternoon, 29 December, Section K will meet jointly with the Section on History and Philosophy of Science (L) and the American Philosophical Association in the Ballroom Foyer of the Copley-Plaza Hotel, in the presentation of a symposium on "How Far Can Scientific Method Determine the Ends for Which Scientific Discoveries Are Used?" At 4:30 P.M. in the same room, Section K will present a symposium on "Empirical Research in the Field of Propaganda," Paul Lazarsfeld presiding. Following introductory remarks on the present state of propaganda research by the presiding officer, C. W. Mills will speak on "The Flow of Influence in an American Community," and Sanford Flowerman will speak on "The Testing of Interracial Propaganda." The session will then be thrown open to discussion.

## (L) History and Philosophy of Science

The program of the Section on History and Philosophy of Science will run from Saturday evening, 28 December, through Tuesday afternoon, 31 December. The opening session will be held jointly with the American Philosophical Association in the State Suite of the Copley-Plaza Hotel. Philipp Frank, C. W. Churchman, A. P. Ushenko, and Ralph W. Gerard will participate in a symposium on "The Place of Philosophy of Science in the Curriculum." On Sunday afternoon, 29 December, a joint session will be held with the Section on Social and Economic Sciences (K) and the American Philosophical Association in the Ballroom Foyer of the Copley-Plaza Hotel. P. W. Bridgman, Felix S. Cohen, Talcott Parsons, and C. I. Lewis will participate in a symposium on "How Far Can Scientific Methods Determine the End for Which Scientific Discoveries Are Used?" A symposium on "The Place of the History of Science in General Education" will be held in the Colonial Room of the Copley-Plaza Hotel on Monday morning, 30 December. This session will be sponsored jointly by the Section on Education (Q) and the History of Science Society. James B. Conant, president of the AAAS, will speak on "Understanding of Science." He will be followed by George Sarton, speaking on "Qualification of the Teachers of the History of Science," and Henry Guerlac, speaking on "History and the Sciences." Dorothy L. Simpson, vice-president of Section L, will conclude this session with "A Case Report." In the afternoon a symposium on "The History of Wartime Research and Development," sponsored jointly with the History of Science Society, will be held in the State Suite of the Copley-Plaza Hotel. B. R. Baldwin will give a "Report on the History of Military Research and Development in World War II." Other papers to be presented at this session will include "Report on the History of AAF Research and Development in World War II," by Albert F. Simpson; "Report on the History of Naval Research and Development in World War II," by John B. Hefferman; "Report on OSRD and NDRC in Relation to Military Research and Development During World War II," by James P. Baxter, 3rd; and "The Influence of the History of Wartime Research and Development on American Historiography," by John Geise. A discussion by Bernard I. Cohen, Henry Guerlac, F. S. C. Northrup, and R. J. Seeger will conclude the session. On Tuesday morning, 31 December, a symposium on "American Colonial Science" will be presented in the State Suite of the Copley-Plaza Hotel, Richard H. Shryock presiding. The topics include: "The Scientific Environment in Philadelphia During the Later 18th Century," "The Morning Hours of Yankee Science," and "Some of the Effects of Colonial Thought." These papers will be followed by a general discussion led by Perry Miller. Dorothy Simpson will preside at the final afternoon session in the State Suite of the Copley-Plaza Hotel. Among the concluding papers will be: "The Importance of the Individual in Human Evolution," by Harold Blum; "The Philosophical Background of the Modern Unification of the Morphological and Functional Aspects of Living Matter," by H. Herrman; and "A Natural Specification of Societies," by Edward F. Haskell.

## (M) Engineering

The Section on Engineering will meet on Saturday and Monday, 28 and 30 December, in Room 250, Building 10, Massachusetts Institute of Technology. The Saturday sessions will be devoted to papers from the Office of Naval Research and the Monday sessions to papers from the U. S. Army Air Forces, Wright Field. Titles of the first day's session include: "Basic Research on Jet and Rocket Propulsion," "Ram Jet Research and Development," "Future of Aircraft Powerplants," "Gas Turbines," "Electronics," and "High-Altitude Research (V-2 Rockets)." Titles from the second day's sessions include: "Determination of the Temperature Distribution in the Gas Turbine Wheel," "Exhaust Cooling," "Aircraft Engine Testing Facilities," "Armament Trends," "Aircraft Cabin Supercharging and Air Conditioning by Engine Bleed Off," "Problems of the Army Air Forces Photography," "Jet Propulsion Thrust Augmentation With

Water Injection and After-Burning," "Flight Path of an Airplane Landing Under Automatic Navigation," "Basic Problems of Low-Frequency Navigational Systems," and "Remote Control of Aircraft by Radio Means."

## (N) Medical Sciences

The sessions of the Section on Medical Sciences will be held in the auditorium of Building C at the Harvard School of Public Health, located at 55 Shattuck Street, Boston. Twenty-six papers will be presented in a symposium on "The Rickettsial Diseases of Man." The opening session on Thursday evening, 26 December, will include papers on epidemic typhus in North Africa, Italy, and Yugoslavia, the European Theater, Japan, and Korea. Also included in this session will be papers on "Tsutsugamushi Disease" and "Q. Fever." The Friday morning session, 27 December, will center about the rickettsial diseases of man, their taxonomy, biology, laboratory procedures in isolation and identification, vectors, and reservoirs of infection. The afternoon session will consider the pathology of rickettsial diseases in man, symptomatology of rickettsial diseases in man, and the treatment of rickettsial diseases in man. The Saturday morning session, 28 December, will treat serology in the rickettsial diseases of man, including a method for the preparation and standardization of rickettsial vaccine. The afternoon session will treat the problems of immunization, control of vectors of rickettsial diseases, and the use of insecticides, particularly the application of DDT, and will conclude with a paper on the influence of rickettsial diseases on military operations, past-present-future. The Monday morning and afternoon sessions, 30 December, consist of contributed papers dealing with "Histopathology of Skeletal Muscle," "Significance of Character of Antihistamine Drugs," "Fibrinogen: With Special Reference to Its Preparation and Certain Properties of the Product," "Medical Results of Crossroads Operation," "Effects of Anesthesia on Some Neurotropic Virus Infections in Mice," "Physiological Aspects of Pilot Ejection," "Host Nutrition and Natural Resistance in Nine Different Models of a Single Disease," "Tolerance of Pilots to Short-Time High g Force During Curvilinear Flight," and "An Accurate Photometric Method for the Evaluation of Protection From Roentgen-Ray Exposure."

## (Nd) Subsection on Dentistry

Dentists will meet all day on Sunday, 29 December. A symposium on "Biologic Aspects of Periodontal Disease" will be presented. On Sunday evening, a dinner session will be held in Parlor C of the Statler Hotel, followed by a round-table discussion on current research problems in periodontal disease.

## (Np) Subsection on Pharmacy

The Subsection on Pharmacy will present a series of technical papers on Saturday morning, afternoon, and evening, 28 December, in the Statler Hotel. The morning session will be devoted to scientific papers, and the afternoon and evening sessions will deal with pharmaceutical engineering, followed by a round-table discussion.

## (O) Agriculture

The Section on Agriculture will present a symposium on "Freedom From Want" on Monday morning and afternoon, 30 December, in the Ballroom Foyer of the Copley-Plaza Hotel. The papers include: "Population and World Food Supplies," by H. R. Tolley; "World Soil and Fertilizer Resources," by R. M. Felter; "Animal Production in an Efficient Food Economy," by F. B. Morrison; "The Current Economics of Freedom From Want," by John D. Black; and "The Obligations of Science in Attaining Freedom From Want," address of the retiring vice-president of the Section, M. A. McCall.

## (Q) Education

The Section on Education will hold a three-day session on Friday, Saturday, and Monday, 27, 28, and 30 December. Except for joint sessions, Section Q will meet in Parlor B of the Bradford Hotel. Titles from the Friday morning session include: "The Relative Value of Three Methods of Presenting Learning Material," "Educational Implications of Concepts Related to Test Validity," "The Improvement of the Higher Mental Processes in Reading," "Was Counseling Worth While?: A Follow-Up Study of Selected Veterans," and "An Evaluation of the Biarritz American University." The Friday afternoon session will center about a discussion of the "Implications of Armed Services Educational Programs," Guy T. Buswell presiding. Participants include: M. M. Chambers, Robert J. Matthew, Elwood C. Davis, and Howard Rusk. On Saturday evening, the Section on Education will join with the Section on Psychology (I) for the presentation of the retiring vice-presidential addresses of both sections. Sidney L. Pressey will speak on " 'Efficiency Engineering' in the Educational Emergency," and Guy T. Buswell, on "Perceptual Research in Methods of Learning." The following Monday afternoon, Dr. Buswell will preside at a general program at which papers will be presented on: "Techniques and Apparatus for Demonstrating and Studying Electronics Circuits," "An Evaluation of the Technique Used in Location of Science Education Objectives With Relation to Two Problem Situations (Soil Conservation and Community Health)," "Science Education and the Regional Community of Eastern Con-

necticut," and "The Impact of Scientific Developments and Technological Trends on Educational Policies in the Secondary School." The concluding paper will be on "Science Teaching in One World." Joint symposia with the Sections on Physics (B), Psychology (I), and Social and Economic Sciences (K) will be held on Saturday morning, afternoon, and evening. A general synopsis of these programs appears under the Section on Social and Economic Sciences (K).

## Programs of Societies

### Institute of Mathematical Statistics

Although the Section on Mathematics has planned no separate session for the Boston meeting, the Institute of Mathematical Statistics has arranged a joint session with the Biometrics Section of the American Statistical Association. "The Analysis of Variance in Biology" will be presented in two parts on Saturday morning and afternoon, 28 December, at the Statler Hotel.

### American Meteorological Society

Business sessions will be held on Friday afternoon, 27 December, and Saturday morning and afternoon, 28 December, at the Institute of Geographical Exploration, Harvard University. Members of the American Meteorological Society are invited to attend a luncheon at 12:30 P.M. on Saturday at the Harvard Faculty Club, Harvard University. A dinner session will also be held Saturday evening at the Continental Hotel, Cambridge. On Monday morning a session on "The Gaseous Envelope of the Earth" will be co-sponsored with the Section on Physics (B), Astronomy (C), and the American Astronomical Society. A more detailed discussion of this meeting will be found under the American Astronomical Society.

### The American Astronomical Society

In observance of the centennial celebration of the establishment of the Harvard College Observatory on its present site, the American Astronomical Society has prepared an extensive program of special events to be presented over a four-day period. A symposium on "Interstellar Matter" will be held at Longfellow Hall, Radcliffe College, on Friday morning and afternoon, 27 December. On Saturday morning, 28 December, the Society will meet at the Computation Laboratory, Harvard University, for a symposium on "Electronic and Computational Devices of Interest to Astronomers." On Saturday afternoon a symposium on "Eclipsing Binaries" will be presented at Harvard Observatory. The first annual Henry Norris Russell Lecture will be given in Longfellow Hall, Radcliffe College, on Saturday evening at 8:15 P.M. Dr. Russell will lecture on "The Royal Road of Eclipses." A Sunday afternoon session, 29 December, at Harvard Observatory will be devoted to general papers on astronomy. In the evening, Harlow Shapley will present an address, as retiring president of the American Astronomical Society and Christmas lecturer of the Sigma Xi, on "Goals of International Cooperation." This session, commencing at 8:15 P.M., will be held in Sanders Theater, Harvard University. The concluding session on Monday morning, 30 December, will be a symposium on "The Gaseous Envelope of the Earth," sponsored in cooperation with the Sections on Physics (B), Astronomy (D), and the American Meteorological Society. Among the titles of papers are: "The Solar Corona and Ultraviolet Radiation," "Solar Activity," "Ionosphere," "Earth-Sun Relationships," "The Sun and Conditions in Upper Atmosphere," "Meteors and Upper Atmosphere," "Solar Variability and Radio Disturbances," "Solar Activity, the Ozone Layer, and the Lower Atmosphere," and "Solar Activity and the General Circulation of the Lower Atmosphere."

### The Geological Society of America

The Society is co-sponsoring meetings with the Section on Geology and Geography (E). The joint program is described briefly under Section E.

### The American Society of Parasitologists

This Society will hold most of its sessions in the Salle Moderne Room of the Statler Hotel. On Friday, 27 December, however, the sessions will be held in the amphitheater of Building E2, Harvard Medical School, Longwood Avenue, Boston. At the morning session Norman R. Stoll, president of the American Society of Parasitologists, will give an address on "This Wormy World." The Parasitologists' Luncheon, to be followed by the annual business meeting, will be held at 12:30 P.M. at Longwood Towers, Longwood Avenue and Chapel Streets, Brookline. A demonstration program has been planned for the Friday afternoon session, during which refreshments will be served to visitors. "*Trichomonas* and Related Flagellates" will be the subject of a symposium presented on Saturday morning, 28 December, in the Salle Moderne Room, followed in the afternoon by a program of general technical papers in Parlor A of the Statler Hotel.

### The American Society of Zoologists

The Society will hold a three-day session commencing on Saturday, 28 December, and continuing through Tuesday afternoon, 31 December. On Saturday morning three sessions will be held on General Physiology; Embryology; Protozoology, Parasitology, and Ecology. A joint symposium with the Genetics Society of America, on "Mammalian Patterns of Sex Behavior," will

be held in the Georgian Room of the Statler Hotel on Saturday afternoon. Three papers will be presented: "Physiological Bases of Mammalian Sex Behavior," "Social Factors in Primate Sex Behavior," and "Sources of Human Sex Behavior." On Saturday evening all zoologists are invited to attend the Biologists' Smoker, sponsored by the American Society of Naturalists. Again, on Sunday morning concurrent sessions will be held on General Physiology; Embryology; Endocrinology and Cytology. The annual business meeting of the Society will be held on Sunday at 12:10 P.M. in the Salle Moderne Room of the Statler Hotel, followed by a demonstration program at 2:30 P.M. in the Biological Laboratories, Harvard University. Motion-picture demonstrations will be given in the main lecture room, and demonstrations of a general nature in Rooms 171, 173, and 180. The Zoologists' Dinner, open to all zoologists and friends, will be held at 7:00 P.M. in the Statler Hotel. Alfred E. Emerson, vice-president of the AAAS and chairman of Section F, will present an address on "Why Termites?" On Monday morning, three concurrent sessions will cover General Physiology, Endocrinology, and Cellular Physiology. A symposium on "Biology on the Molecular Level" will be held in the afternoon, Dwight E. Minnich presiding. Papers to be presented at this session include: "Biochemical Evolution," "Molecular Cytology," and "Biochemical Control of Morphogenesis." On Tuesday afternoon, the zoologists will participate with the American Society of Naturalists, Botanical Society of America, Genetics Society of America, and Society for the Study of Evolution in a symposium on "Genetic Aspects of Natural Populations."

## The Cambridge Entomological Club

The Club has arranged to hold its December meeting on Thursday evening, at which time Clarence H. Kennedy, The Ohio State University, will deliver a lecture on "The Child Labor of Termites Versus the Adult Labor of the Ant Society." The meeting will begin at 8:00 P.M. in Room B–455, Biological Laboratory, Harvard University, Cambridge, and will be followed by an informal social gathering for entomologists attending the Boston meeting.

## American Microscopical Society

The luncheon session of the executive committee will be held at 1:30 P.M., Thursday, 26 December, in the Terrace Room of the Statler Hotel. The annual meeting will be held at 4:00 P.M. on Friday, 27 December, in the Hancock Room of the Statler Hotel.

## American Society of Naturalists

The program of the 62nd annual meeting will commence on Saturday, 28 December, and run through Tuesday afternoon, 31 December. The Biologists' Smoker, a social event sponsored by the Naturalists to which all biologists are cordially invited, will be held in the Ballroom Assembly of the Statler Hotel commencing at 9:00 P.M. on Saturday, 28 December. On Monday, 30 December, the executive committee will meet at 4:00 P.M. in Parlor D of the Statler Hotel. At 6:30 in the evening, the Naturalists' Dinner will be held in the Georgian Room of the Statler Hotel. Charles W. Metz, president of the Society, will deliver a lecture on the "Duplication of Chromosome Parts as a Factor in Evolution." A joint session with the American Society of Zoologists, Botanical Society of America, Genetics Society of America, and Society for the Study of Evolution will be held at 2:00 P.M. on Tuesday in the Salle Moderne Room of the Statler Hotel. T. Dobzhansky, Carl Epling, and Jens Clauson will participate in a symposium on "Genetic Aspects of Natural Population."

## Ecological Society of America

The program of the 31st annual meeting will commence on Friday afternoon, 27 December, and run through Monday afternoon, 30 December. A symposium on "Mortality Table Methods Applied to Biological Problems" will be presented in Parlor B of the Statler Hotel on Friday afternoon. This session is co-sponsored by the Biometrics Section of the American Statistical Association. Running concurrently in the Salle Moderne Room of the Statler Hotel will be a technical session on "Plant Ecology." On Saturday morning, 28 December, concurrent sessions will be held on Applied Ecology, Animal Ecology, and "Origin and Development of Natural Floristic Areas With Special Reference to North America," a joint symposium with the Botanical Society of America, American Society of Plant Taxonomists, and Society for the Study of Evolution. The symposium will continue in the afternoon, running concurrently with another symposium on "Marine Ecology," held jointly with the Limnological Society of America. At 6:30 on Saturday evening, the Ecologists will hold a dinner session in Parlor A of the Statler Hotel; and on Sunday, weather permitting, an excursion to Newburyport and Plum Island salt marshes and sand dunes will be arranged for those interested, provided enough private cars are available. Members of the Ecological Society are extended a special invitation to attend an exhibit on "Methods and Results in Aquatic Research," sponsored by the Limnological Society of America on Sunday, 29 December, between 3:00 and 6:00 P.M., Room 158, Biological Laboratories, Harvard University, Cambridge. Two concurrent sessions will be held on Monday morning, one on "Animal Ecology" in the Salle Moderne Room of the Statler Hotel, and the other, a joint program of

technical papers with the Botanical Society of America, in the Sheraton Room of the Copley-Plaza Hotel. A joint session will be held with the Society for the Study of Evolution on Monday afternoon in the Ballroom Assembly of the Statler Hotel, followed by the annual business meeting at 3:30 P.M. in Parlor B.

### Genetics Society of America

The 14th annual meeting will be held between Friday, 27 December, and Tuesday afternoon, 31 December. The opening session of short papers will be held on Friday at 2:00 P.M. in Parlor A of the Statler Hotel. A Saturday morning demonstration program has been scheduled in Room 182, Biological Laboratories, Harvard University. The luncheon and business meeting of the Genetics Society will be held at 1:00 P.M. in the Continental Hotel, Cambridge, followed by a symposium on "Mammalian Patterns of Sex Behavior," a joint session with the American Society of Zoologists, convening at 2:00 P.M. in the Georgian Room of the Statler Hotel. Monday morning and afternoon will be devoted to sessions of short technical papers. On Tuesday afternoon, a series of invitation papers (20 minutes each with 5-minute discussions) will be presented in Parlor A of the Statler Hotel, George W. Beadle presiding. The final session, on "Genetic Aspects of National Populations," will be held jointly with the American Society of Naturalists, American Society of Zoologists, Botanical Society of America, and Society for the Study of Evolution.

### The Limnological Society of America

The Society will hold its ninth annual meeting on Saturday, Sunday, and Monday, 28–30 December. In addition to the technical sessions, a joint symposium with the Ecological Society of America, on "Marine Ecology," will be held in the Ballroom Assembly of the Statler Hotel on Saturday afternoon, and a symposium on "Fertilization of Aquatic Areas" in the Georgian Room of the Statler Hotel on Monday morning and afternoon. A Sunday afternoon exhibit, in Room 158 of the Biological Laboratories, Harvard University, will demonstrate "Methods and Results in Aquatic Research."

### The National Association of Biology Teachers

The Association will open its sessions with a symposium on "Ecology and Teaching of Ecology," Saturday, 28 December. The morning session will deal primarily with "What in Ecology Is Most Significant to the Biology Teacher?" and the afternoon session, with "The Teaching of Ecology." The meeting will conclude with a dinner session in the Colonial Room of the Copley-Plaza Hotel at 6:30 P.M. Following the annual banquet, P. L. Whitaker will introduce the 1947 officers.

### The Phi Sigma Biological Society

Business meetings of the Society will be held on Friday and Saturday, 27–28 December. The concluding session will be a dinner meeting on Saturday evening in the Salon Room of the Copley-Plaza Hotel. A. M. Keefe will address the Society on "The Padre Was a Biologist."

### The Society for the Study of Evolution

The Society's first annual meeting with the Association will be held from Saturday, 28 December, through Tuesday, 31 December. On Saturday morning and afternoon, the evolutionists will participate with the Botanical Society of America, American Society of Plant Taxonomists, and Ecological Society of America in a symposium on "The Origin and Evolution of Natural Floristic Areas With Special Reference to North America." A technical session will be held on Monday morning, followed by a joint session with the Ecological Society of America on Monday afternoon. On Tuesday morning, 31 December, the Society will meet in Parlor C of the Statler Hotel, and on Tuesday afternoon will join with the American Society of Naturalists, American Society of Zoologists, Genetics Society of America, and Botanical Society of America in presenting a symposium on "The Genetic Aspects of Natural Populations."

### The American Fern Society

The Society will hold a single session on Saturday morning, 28 December, in the Green Room of the Lenox Hotel. Frederick L. Fagley will preside at a program of general papers.

### The American Society of Plant Physiologists

The Society will hold its 21st annual meeting on Friday, Saturday, and Monday, 27, 28, and 30 December. The opening session, at 9:30 A.M. in Room 310 of the Soden Building, Boston University, 84 Exeter Street, will be joint with the Physiological Section of the Botanical Society of America. In addition to sessions held jointly with Sections of the Botanical Society of America and independent meetings on growth activators and inhibitors, chlorophyll metabolism and photosynthesis, the American Society of Plant Physiologists will participate in a joint session with the Section on Agriculture (O) and the American Society for Horticultural Science, in a symposium on "Plant Respiration," to be held in the Colonial Room of the Copley-Plaza Hotel on Saturday afternoon, 28 December. The Plant Physiologists' Dinner will be held at 6:30 P.M. on Friday in the Ballroom of the Vendome Hotel. Following the dinner there will be an announcement of the Charles Reid Barnes Life Membership Award and the Stephen Hale Award. Paul J. Kramer will address the session on "A Viewpoint for Plant Physiologists."

### The American Society of Plant Taxonomists

Most of the Society's sessions will be held in the Soden Building of downtown Boston University, 84 Exeter Street. With the exception of the Plant Taxonomists' Dinner, scheduled on Friday evening at 6:30 in the Monaco Room of the Lenox Hotel, all sessions will be held jointly with the Botanical Society of America.

### The Botanical Society of America, Inc.

The Society's 41st annual meeting will be held from Thursday, 26 December, to Monday, 30 December, inclusive. The Copley-Plaza Hotel will be official headquarters, and most of the meetings will be held in the Soden Building of downtown Boston University, 84 Exeter Street. In addition to the joint meeting with Section G on Friday afternoon, there will be other joint meetings with the American Society of Plant Physiologists, American Society of Plant Taxonomists, American Fern Society, Mycological Society of America, Ecological Society of America, and American Society for Horticultural Science. Special symposia on "Antibiotics, Variation and Mutation in Microorganisms," "Origin and Development of Natural Floristic Areas With Special Reference to North America," "Nutrition and Metabolism of Microorganisms," "Plant Respiration," "Problems of Teaching Botany in the Beginners' Course," "Great Teachers of Botany in the United States," and "Genetic Aspects of Natural Populations" have been arranged for the joint sessions, while programs of the other sections will consist in large part of contributed papers of a technical character. The Microbiological, Paleobotanical, Physiological, and Systematic Sections will participate in the joint sessions. The All Botanists' Dinner will be held at 6:30 P.M. on Saturday in the Ballroom Foyer of the Copley-Plaza Hotel. The Council will meet at 10:00 A.M. on Sunday, 29 December, in the Blue Room of the Copley-Plaza Hotel. On Monday evening, 30 December, a special meeting sponsored by the New England Botanical Club, Inc., will be held at the house of the American Academy of Arts and Sciences, 28 Newbury Street. Merritt L. Fernald will deliver an address on "The Founders of New England Botany." Carl L. Wilson will preside at a joint Saturday afternoon session with the Committee on Botanical Teaching in Room 208 of the Soden Building. There will be an exhibition of motion-picture films for teaching purposes in the introductory course to botany, followed by a discussion of the "Place of Visual Education in Teaching."

### The Mycological Society of America

The Society will meet on Friday, Saturday, and Monday, 27, 28, and 30 December, in Jacob-Sleeper Hall of Boston University, located at 688 Boylston Street. At the Friday morning session G. B. Cummings, president of the Society, will give a lecture on "Problems in Mycological Taxonomy." Other papers on the morning program deal with mycological nomenclature. In general, the remainder of the sessions will be comprised of papers of a taxonomic or physiological nature, including those presented jointly with the Microbiological Section of the Botanical Society of America.

### The Sullivant Moss Society

A breakfast session of the Society will be held on Saturday, 28 December, at 8:00 A.M. in the Blue Room of the Copley-Plaza Hotel, and will be followed by a regular session at 10:00 A.M. A second session of technical papers will be presented in the afternoon in the same room, Richard T. Wareham presiding at both meetings.

### The American Phycological Society

A business meeting for organization purposes will be held at 4:00 P.M. on Monday, 30 December, in the Blue Room of the Copley-Plaza Hotel, G. W. Prescott presiding.

### The Society for Research in Child Development

The Society will meet on Friday and Saturday, 27–28 December. A symposium on "Methodological Problems Met in Integrating and Interpreting Physical, Medical, Psychological, and Social Data in Longitudinal Studies of Children" will be presented on Friday at 9:30 A.M. in the Main Ballroom of the Bradford Hotel. A symposium on "Psychological Problems Met in General Medical Practices With Children" will be held in the same room at 1:30 P.M. This meeting will be followed by a business session at 3:30 P.M. The Saturday morning session will consist of research reports, while the Saturday afternoon session will consist of "Reports on the Effects of Severe War Conditions Upon Child Development and Behavior." Both sessions will be held in the Main Ballroom of the Bradford Hotel.

### The American Statistical Association, Biometrics Section

The Biometrics Section will hold several joint symposia, including: "Biometric Methods of Fishery Investigations," with the Atlantic Fishery Biologists; "Mortality Table Methods Applied to Biological Populations," with the Ecological Society of America; and "The Analysis of Variance in Biology," with the Institute of Mathematical Statistics. These sessions, held from Friday, 27 December, through Sunday, 29 December, will conclude with a series of contributed

papers on Sunday morning and afternoon. The luncheon of the Biometrics Section will be held in Parlor A of the Statler Hotel at 12:00 noon on Sunday and will be followed by a business session.

### Pi Gamma Mu, National Social Science Honor Society

Pi Gamma Mu will open its program at noon on Friday, 27 December, with a luncheon given jointly with the Section on Social and Economic Sciences (K). On Saturday morning and afternoon, 29 December, Pi Gamma Mu will sponsor a symposium on "The Shortage of Scientific Personnel" with the Sections on Physics (B), Psychology (I), Education (Q), and Social and Economic Sciences (K). It will also participate in a joint meeting with these sections in a symposium on "Science Legislation and Problems of Federal Aid," to be given in the Sheraton Room of the Copley-Plaza Hotel on Saturday evening.

### The American Philosophical Association

The Association will meet jointly with the Section on History and Philosophy of Science (L) on Saturday evening, 28 December, and Monday afternoon, 30 December, in the Copley-Plaza Hotel. "The Place of Philosophy of Science in the Curriculum" will be the subject of the Saturday evening session, a symposium commencing at 8:15. On Sunday afternoon, 29 December, a symposium will be presented on "How Far Can Scientific Methods Determine the Ends for Which Scientific Discoveries Are Used?" This session, starting at 2:30 P.M., is sponsored jointly with Sections on History and Philosophy of Science (L) and Social and Economic Sciences (K).

### The History of Science Society

All of the meetings of the Society will be held jointly with the Section on History and Philosophy of Science (L).

### The Philosophy of Science Association

The Association will meet at 1:30 P.M. on Friday, 27 December, in Parlor A of the Kenmore Hotel. The activities of this society and plans for its future will be discussed. W. W. Malisoff will read a paper on "A Program for a Philosophy of Science Movement."

### The American Dietetic Association

The Association will meet on Friday afternoon and Saturday morning, 27–28 December, in the second-floor lecture room of the Harvard School of Public Health, located in the Huntington Building, 695 Huntington Avenue, Boston. The speakers at the first session will discuss methods of conducting nutrition surveys both at home and abroad. At the Saturday morning session Elda Robb, Simmons College, will preside over a discussion of nutrition education in the schools.

### The American Society for Horticultural Science

The Society will begin its activities on Friday morning, 27 December, with three concurrent sessions on "Pomology-Cultural," "Small Fruits," and "Vegetables-Herbicides, Growth Regulators, Pesticides." Two concurrent sessions, on "Vegetables-Potatoes, Root Crops" and "Pomology-Physiology," will be held on Friday afternoon. On Friday evening, there will be a "Round Table Discussion on Teaching" and a "Round Table for Extension Specialists in Horticulture." "Pomology-General," "Vegetables-General," "Floriculture and Ornamental Horticulture" will be the subjects of the concurrent Saturday morning sessions, 28 December, followed by a symposium on "Plant Respiration" on Saturday afternoon. On Saturday evening at 6:30 P.M., the annual banquet and social gathering of the Society will be held in Horticultural Hall, 300 Massachusetts Avenue, Boston. G. F. Potter will present the retiring presidential address. Sunday morning, 29 December, concurrent sessions will cover "Vegetables-Breeding," "Pomology-Fruit Thinning," "Hormone Sprays, Orchard Herbicides," and "Floriculture and Ornamental Horticulture." A business meeting for a report of committees and election of officers will be held at 1:30 P.M. on Sunday in the Colonial Room of the Copley-Plaza Hotel and will be followed by a general session at 2:30 P.M. at which G. F. Potter will preside. All meetings of the American Society for Horticultural Science will be held in the Copley-Plaza Hotel.

### The Cooperative Committee on Science Teaching of the AAAS

The Committee will meet jointly with the National Science Teachers Association on Friday morning and evening, 27 December, in Parlor A of the Bradford Hotel and on Sunday evening, 29 December, in the Oval Room of the Bradford Hotel. The latter session will hold a forum on "Problems of Science Teaching."

### The National Science Teachers' Association

The Association will hold its second annual meeting at the Boston meeting of the AAAS. Convention headquarters will be in the Oak Room of the Bradford Hotel throughout the period of the meetings from Thursday evening, 26 December, to Monday evening, 30 December. The Friday meetings include: a joint session with the Cooperative Committee on Science Teaching of the AAAS; an afternoon Junior Scientists' Assembly at which papers, talks, and discussions will be presented by members and recent members of Junior Academies of Science, Science Clubs of America, and School Science Club; and an evening meeting, again with the Cooperative Committee on Science Teaching of the AAAS. All Friday sessions

will be in the Bradford Hotel. The New York State Science Teachers Association will hold a Board of Directors' meeting at 8:00 P.M. on Friday in Parlor B of the Bradford Hotel. The Saturday sessions will be held at the Massachusetts College of Pharmacy, located at 179 Longwood Avenue. (Members are advised to take the Huntington Avenue subway car at Park Street, getting off at Longwood Avenue.) At the general Saturday morning session, Morris Meister will discuss "Activities of the National Science Teachers Association." At 10:00 A.M., the Sections of the NSTA on Physics, Chemistry, and General Science will meet separately. The annual luncheon of the National Science Teachers Association will be held at 12:30 P.M. on Saturday, 28 December, in the Salle Moderne Room of the Statler Hotel. The Saturday afternoon session, to be held on the first floor of the Massachusetts College of Pharmacy, will consist of science projects presented by New England pupils. On Sunday evening a forum on "Problems of the Science Teachers" will be held in the Oval Room of the Bradford Hotel, jointly with the Cooperative Committee on Science Teaching of the AAAS. The Monday session will also be held at the Massachusetts College of Pharmacy, 179 Longwood Avenue. In the morning, D. E. Sollberger will discuss "Time for Science Teaching—The 1946 NSTA Yearbook," and Bertha A. Slye will speak on "Science Teaching Packets—A NSTA Project." Following this general session, commencing at 10:00 A.M., there will be independent meetings of the Physics, Chemistry, and General Science Sections. On Monday afternoon, 30 December, a comprehensive exhibit of teaching materials from industry will be presented on the first floor of the Massachusetts College of Pharmacy.

### Pi Lambda Theta

Pi Lambda Theta will hold a dinner session for members and their guests in the Oval Room of the Bradford Hotel on Monday, 30 December, at 6:00 P.M. Hostess chapters will include Alpha Gamma and Alpha Eta.

### The American Nature Study Society

The Society will hold a two-day session on 27-2[8] December. The Friday morning session in the Oa[k] Room of the Bradford Hotel will be a discussion o[f] the problem, "How to Increase National Resour[ce] Planning and Conservation Education in Our Scho[ol] Programs Through Present Subject Matter Areas." The Friday afternoon session will deal with repor[ts] from the various conservation workshops on "Th[e] Conservation Workshop Method in Training Teache[rs] and Leaders in Conservation and Planning Program[s] in Conservation." The dinner of the American Natur[e] Study Society, to be followed by the annual meetin[g] will be held in the Oval Room of the Bradford Hot[el] at 6:30 P.M. on Friday, 27 December. On Saturday[,] the general topics include: "New England's Natur[al] and Conservation Plans and Programs," "Organizin[g] the Fourteen Southern States for Resource Use Edu[-] cation Through the Southern Resources Committee," and "Improving Camping Education Through Greate[r] Use of Natural Resources."

### The National Association of Science Writers

Members of the Association have been invited t[o] participate in a symposium on "The Quality of Sci[-] ence Writing Now Being Presented to the American Public" as guests of the Harvard Nieman Foundation for Journalism. The panel of speakers includes James B. Conant, president of Harvard University, and Fletcher Watson, of the Harvard School of Education. The meeting will be held at 8:00 P.M. at the house of the Signet Society, 46 Dunster Street, Cambridge.

### Sigma Delta Epsilon

Sigma Delta Epsilon will hold its National Council Meeting in Parlor E of the Statler Hotel on Friday morning, 27 December. On Sunday afternoon, 2[9] December, it will sponsor a luncheon for all women in science, to be held in the Monaco Room of the Lenox Hotel. The National Convention Breakfast will be held on Monday, 30 December, at 8:00 A.M. in the Salon of the Copley-Plaza Hotel.


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# News and Notes

## About People

*Subrahmanyan Chandrasekhar,* University of Chicago theoretical astrophysicist, has been appointed distinguished service professor at the University, President Ernest C. Colwell announced on 22 November. Dr. Chandrasekhar, a native of India, has been associated with the University's Astronomy Department at Yerkes Observatory, Williams Bay, Wisconsin, since 1937. Last year he was honored by Andhra University, India, with the Sir Cattanmanchi Ramalinga Reddy National Prize for Mathematics. During the war, Dr. Chandrasekhar acted as a consultant to the War Department at Aberdeen Proving Ground in addition to his regular teaching and research program at Yerkes Observatory.

Dr. Chandrasekhar did his undergraduate work in India at Presidency College (Madras University) and then went to England as a Government of India research scholar to study theoretical physics. He received his Master's degree from Madras in 1930 and his Ph.D. and Sc.D. from Cambridge University in 1933 and 1942. His recent work at Yerkes Observatory includes published papers on the nuclear transformation of chemical elements in the universe and on the origin of the heavy atoms. He has also been engaged in the study of radiative transfer. He is the author of *An introduction to the study of stellar dynamics* and *Principles of stellar dynamics.* Dr. Chandrasekhar is a fellow of the Royal Society of London and a member of the American Philosophical Society and the London Mathematical Society.

*Bryan P. Glass* has been appointed instructor and research worker in mammalogy, Department of Zoology, Oklahoma A. and M. College.

*O. Boyd Houchin* joined the staff of the Department of Biochemistry, School of Medicine, University of Louisville, on 1 July. Dr. Houchin was formerly assistant professor of biological chemistry in the School of Medicine, Loyola University, Chicago.

*H. Radclyffe Roberts,* of the Academy of Natural Sciences, has been appointed assistant curator of the Academy's Department of Entomology. Dr. Roberts, formerly a research associate, is also a trustee of the Academy.

*Glenn S. Rabideau,* formerly chemist with the McLaughlin Gormley King Company, Minneapolis, and associate scientist, University of Minnesota, has been made assistant professor, Department of Botany and Bacteriology, University of Texas.

*Charles F. Church,* who recently resigned from the staff of the Squibb Institute for Medical Research to enter private practice in internal medicine, has accepted the chairmanship of the New Jersey State Nutrition Council.

*Ray L. Watterson,* formerly of the University of California, has been appointed assistant professor of zoology, University of Chicago.

*Alfred Seely Brown* has returned to Colgate University as associate professor of chemistry in charge of the work in general and physical chemistry. During the war years he developed the research laboratory of the Skenandoah Rayon Corporation, a division of Beaunit Mills, Utica, New York, in his capacity as director of research.

*Reginald M. Archibald* has been made professor of biochemistry at the Johns Hopkins School of Hygiene and Public Health to fill the vacancy created by the retirement of E. V. McCollum. Dr. Archibald was a special investigator at the Hospital of the Rockefeller Institute for Medical Research, as a member of an antimalarial research team for OSRD. Prior to his appointment in Baltimore, he was an associate at the Rockefeller Institute.

In addition to Dr. Archibald, two assistant professors of biochemistry have also been added to the staff of the School. Lawrence L. Layton, formerly assistant professor of chemistry at the University of Maryland, will be engaged in research in the field of biophysical chemistry. Dominic Dziewiatkowski, formerly instructor in biological chemistry at Vanderbilt University, is the second new member.

Mrs. E. V. McCollum will remain as assistant professor and will continue her work on studies of animal nutrition.

*H. Weston Blaser,* formerly at Cornell University, has been appointed assistant professor of botany at the University of Washington, Seattle.

*Louis Benjamin* has been appointed chief, Test Division, Chemical Corps Technical Command, Edgewood Arsenal. During the war Maj. Benjamin served as chief of the Test Branch of the Engineering Division, Technical Command.

*A. Packchanian,* University of Texas Medical School, Galveston, was invited to attend the First Inter-American Congress of Medicine, held in Rio de Janeiro on 7–15 September. While in South America, Dr. Packchanian delivered lectures on Chagas' disease, Weil's disease, leishmaniasis, and yellow fever.

*Harold Talbot Lacey* has been appointed senior chemist of the new Willow Island Works of Calco Chemical Division, American Cyanamid Company, and a member of the Technical Committee of the Company's Marietta Works, Marietta, Ohio. Dr. Lacey received his Ph.D. under a Grasselli Fellowship at Cornell University in 1926. After a year of post-graduate work in Vienna, Munich, and Graz he received an Industrial Fellowship to the Mellon Institute. He joined the Grasselli Chemical Company as a research chemist in 1929 and became associated with Calco in 1932 as chemical supervisor of organic pigment research and later as chief chemist of the Pigment Division. During the war Dr. Lacey was in charge of the special research group cooperating with naval research laboratories and bureaus on fluorescent dyestuffs and the development of special pigment applications, particularly for the life jacket dye marker and shark chaser, standard live-saving equipment of the Army and Navy Air Forces.

*Howard A. Rusk,* wartime chief of the Army Air Forces Convalescent Services Program, has been named to head a new Department of Rehabilitation and Physical Medicine at New York University College of Medicine.

*A. K. Snelgrove,* visiting professor of geology at Rutgers University, 1945–46, has returned to his post as head of the Department of Geological Engineering, Michigan College of Mining and Technology, Houghton. The latter institution granted him leave of absence to enable him to initiate at Rutgers a new Bureau of Mineral Research.

*Victor A. Greulach,* formerly associate professor of biology and chairman of the Division of Biological Sciences, University of Houston, is now associate professor of botany, A. and M. College of Texas, and is in charge of the courses in plant physiology.

*Robert H. Broh-Kahn* has been appointed assistant director of the May Institute for Medical Research, Cincinnati, Ohio. Dr. Broh-Kahn, formerly a lieutenant colonel in the Army Medical Corps, has recently returned to civilian life after 50 months of active duty.

*Max T. Rogers,* formerly at the University of California, Los Angeles, has joined the Department of Chemistry, Michigan State College, as assistant professor in physical chemistry.

*Gustave J. Dammin* has been appointed assistant professor of internal medicine and assistant professor of pathology at Washington University School of Medicine, St. Louis. He will serve as director of the Central Diagnostic Laboratories at Barnes Hospital and will aid in the teaching of laboratory diagnosis in the Department of Medicine. Half of his time will be devoted to research and teaching in the Department of Pathology.

*Henry W. Nissen* has been made director of research in biopsychology, Rockland State Hospital, Orangeburg, New York. He is budgeted on the staff of the New York State Psychiatric Institute and Hospital, New York City, from which he is assigned to his present position. According to Frederick MacCurdy, Commissioner of the New York State Department of Mental Hygiene, this new research unit will be under the sponsorship of a Scientific Advisory Committee composed of: Nolan D. C. Lewis, chairman; Robert M. Yerkes, Karl S. Lashley, Henry Garrett, Carney Landis, Russell Blaisdell, Frederic Carnochan; and Elaine Kinder, secretary. The new Committee has been constituted as a subcommittee of the Council for Research in the Social Sciences in Columbia University. The unit will undertake a program of long-term, fundamental research in the field of psychopathology.

*Dudley Williams, John N. Cooper,* and *Robert A. Oetjen* have been appointed to the staff of the Physics Department, The Ohio State University. Drs. Williams and Cooper were connected with the University of California during the 1944–46 projects at the Los Alamos laboratory in New Mexico, which culminated in the production of the first atomic bomb, and Dr. Oetjen was formerly with the Texas Company, carrying on infrared spectroscopic research at the Beacon, New York, laboratory of the firm.

*Victor E. Shelford* retired as professor of zoology, University of Illinois, on 1 September. Dr. Shelford went to the University as assistant professor in 1914, after receiving his Ph.D. in 1907 and later serving as instructor at the University of Chicago. During the last 32 years at the University of Illinois he has been in charge of developing work in animal ecology and has published numerous papers and several books in this field. He will remain at the University, where he is preparing a treatise on the Bio-Ecology of North America.

*Kurt Salomon,* formerly in charge of the Biochemical Research Laboratory, Departments of Neuropsychiatry and Radiology, Washington University Medical School, St. Louis, has been appointed section head in the Division of Radiology and Biophysics, Manhattan Department, and assistant professor, Department of Radiology, University of Rochester School of Medicine and Dentistry. Dr. Salomon took over his new duties on 1 August.

*Erma A. Smith,* associate professor of physiology, Iowa State College, has been appointed resident phy-

sician, Student Health Service, Duke University, Durham, North Carolina.

*Linwood H. Warwick,* junior executive and editor of the Geological Survey Division, Virginia Conservation Commission, was recently honored by friends and associates in the geological and allied sciences upon the completion of 38 years of service with the Survey. At exercises held in the geology lecture room of Brooks Museum, University of Virginia, Mr. Warwick was presented with a gold watch and a leather-bound album of congratulatory letters. Mr. Warwick began work with the Survey in 1908 under the late Thomas Leonard Watson and has served continuously since that time.

*John H. Dillon,* formerly assistant director of research in charge of physics, latex, adhesives, and textile research for the Firestone Tire and Rubber Company, is now director of research at the Textile Foundation, Princeton, New Jersey.

*Jason R. Swallen,* formerly botanist, Division of Plant Exploration and Introduction, Bureau of Plant Industry, Soils and Agricultural Engineering, who has spent the past year in southern Brazil studying the grasses and grasslands of the states of Rio Grande do Sul, Santa Catarina, Paraná, and Mato Grosso, in collaboration with the Instituto Agronomico do Sul, has been appointed associate curator in the U. S. National Museum, Division of Plants, Smithsonian Institution.

*C. Lee Huyck,* until recently senior pharmacist, Winthrop Chemical Company, Rensselaer, New York, is now professor of pharmacy, Columbia University College of Pharmacy.

*Morris Pollard,* until recently chief, Veterinary and Virus Section, Eighth Service Command, Fort Sam Houston, Texas, has been appointed assistant professor of preventive medicine and director of the Virus Laboratory, University of Texas Medical Branch. Prior to his commission with the Army, Dr. Pollard was on the staff of the Animal Disease Station, National Research Center, Beltsville, Maryland.

*Irving S. Wright* has initiated an extensive research program in the Vascular Disease Research Laboratory, New York Hospital, for the study of peripheral vascular diseases with special reference to those problems which deal directly with thrombosis in all its manifestations. This will include the development of new anticoagulants. The work is supported in part by a research grant extended by the Medical Research Division of Sharp and Dohme, Inc.

*John S. Gray* has been made chairman of the Department of Physiology, Northwestern University, succeeding Andrew C. Ivy. Dr. Gray was formerly a professor in the Department. Dr. Gray, whose particular field has been gastrointestinal physiology, is conducting research into respiratory physiology and its application to diseases of the respiratory system.

*R. A. Day* and *Ernest H. Haddock,* Emory University, Georgia, have been promoted from assistant professors to associate professors of chemistry and physics, respectively.

*H. H. Hecht,* University of Utah School of Medicine, has been promoted from instructor to assistant professor of medicine.

*W. A. Selle,* professor of physiology, University of Texas Medical Branch, is surveying American medical centers under the auspices of the Baruch Committee for Physical Medicine in order to develop satisfactory methods for teaching the medical application of physics to undergraduate medical students.

*Walter H. C. Rueggeberg,* formerly a captain, Chemical Warfare Service, has joined the civilian staff of the CWS Technical Command at Edgewood Arsenal, Maryland, as acting chief, Organic Branch, Chemical Division.

*Phil W. Buck,* formerly professor of psychology, University of Toledo, has been appointed to the staff of Rohrer, Hibler & Replogle and will be associated with Ralph W. Ogan, regional director, in the Dallas office.

*William N. Davidson,* formerly in charge of the Department of Agriculture's Insecticide Testing Laboratory, Beltsville, Maryland, has been succeeded by Harold H. Shepard, formerly of the University of Minnesota and Cornell University. Mr. Davidson had served for 35 years in the Department prior to his retirement on 30 June 1946.

*Alan W. Donaldson* has been commissioned as senior assistant scientist (R) with the U. S. Public Health Service and has been assigned to the Parasitology Section of the Laboratory Division, Communicable Disease Center, Atlanta, Georgia.

*Richard Lewis Post,* formerly technician and curator, Oregon State College, and specialist in pest control, U. S. Coast Guard, has been appointed associate entomologist of the North Dakota Experiment Station and State Seed Department, Fargo, North Dakota.

*Carl P. Swanson,* formerly associate professor of botany, Michigan State College, has been appointed associate professor of botany, Department of Biology, The Johns Hopkins University. On his release from the naval service in February 1946, Dr. Swanson was temporarily appointed associate biologist, National Institute of Health, Bethesda, Maryland.

*Cyrus O. Guss,* formerly of the Forest Products Laboratory, Madison, Wisconsin, has been appointed assistant professor of chemistry at the University of Southern California.

*Donald S. Villars* has resigned from the Physics Group of the U. S. Rubber General Laboratories to become professor of chemistry and head of the Science Department of the newly organized Jersey City Junior College. He was with the U. S. Rubber Company for 12½ years, spending the first 3½ years at the Plantations Research Department in Sumatra, Netherlands East Indies.

## Visitors From Abroad

*Francisco Garcia-Valdecasas,* professor of pharmacology, University of Barcelona, Spain, will arrive in the United States early this month to do research work in the Department of Pharmacology, Hahnemann Medical College of Philadelphia, on the electric properties of potent drugs and the related theory of drug action. His work there will be in association with R. Beutner, professor of pharmacology.

*Peter A. Gorer,* Department of Pathology, Guy's Hospital Medical School, London, is conducting research at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine. His work is being aided by a grant from the National Cancer Institute.

## Announcements

*The American College of Physicians* offers a limited number of Research Fellowships, designed to provide an opportunity for research training either in the basic medical sciences or in the application of these sciences to clinical investigation. They are for the benefit of physicians who are in the early stages of their preparation for a teaching and investigative career in internal medicine, pediatrics, and other allied fields. Assurance must be provided that the applicant will be acceptable in the laboratory in which he has chosen to work and that the laboratory will supply the facilities necessary for the proper pursuit of the research. The term of appointment is for one year, usually beginning on 1 July. The stipend will be from $1,800 to $3,000 per annum. Application forms will be supplied on request to The American College of Physicians, 4200 Pine Street, Philadelphia 4, Pennsylvania, and must be submitted in duplicate, with a recent photograph of the applicant. Awards will be made on or about 1 January.

*The United States members of the China-U. S. and Philippine-U. S. Agricultural Missions* have returned from the Far East, where they have been studying plans for the agricultural improvement of China and the Philippine Commonwealth since last June.

The U. S. sections of the agricultural collaborative missions, sponsored by the Departments of State and Agriculture and composed of outstanding agricultural technicians, visited China and the Philippines by invitation, and cooperated with officials of the Governments of those countries in extended agricultural surveys.

Claude Burton Hutchison, vice-president of the University of California and dean of the University's College of Agriculture, is chief of the U. S. section of the China-U. S. mission, and Leland Everett Call, dean of agriculture and director of the Experiment Station at Kansas State College, is chief of the U. S. section of the Philippine-U. S. mission.

The United States agricultural technicians visited the Far East with two over-all objectives: to examine immediate and urgent agricultural problems, recommending action for their solution; to work with local officials in drafting long-term programs for agricultural improvement.

Substantial progress has been made toward these objectives, but several weeks will be required for the completion of the formal reports of the missions.

*A portrait of each of the men* who won the Nobel Prize this year together with an exhibit of his writing will be on display in the foyer of the Thomas Jefferson Room of the Library of Congress annex until the end of December. The laureates are: Hermann J. Muller, Indiana University, medicine and physiology; P. W. Bridgman, Harvard University, physics; and the three who shared the chemistry award, J. B. Sumner, Cornell University, W. M. Stanley and J. H. Northrop, Rockefeller Institute for Medical Research. (See *Science,* 22 November 1946.)

*Women with the equivalent of a Ph.D. degree,* carrying on research in the mathematical, physical, or biological sciences, who need financial assistance and give evidence of high ability and promise are eligible for the third postdoctoral fellowship of $1,500 of Sigma Delta Epsilon, graduate scientific sorority. Applications for the year 1947–48 should be submitted before 1 February 1947 to the Fellowship Board authorized to make the award. Application blanks may be secured from Dr. Louise S. McDowell, 28 Dover Road, Wellesley 81, Massachusetts. Announcement of the award will be made early in March.

*The Department of Zoology and Physiology, University of Illinois,* has announced the following additions to the staff: Robert M. Melampy, University of Louisiana, associate professor; John J. Mahoney, University of Iowa, instructor; Donald F. Hoffmeister, University of Kansas, assistant professor of zoology and assistant curator of the Museum of Natural History; and Ben B. Blivaiss, formerly in pharmacolog-

ical research, Toxicity Laboratory, University of Chicago, instructor.

*The Department of Chemistry, Indiana University,* has announced the following changes: Frank C. Mathers, appointed interim chairman to succeed R. L. Shriner, who resigned on 1 July; J. H. Billman, on sabbatical leave for the academic year 1946–47 and planning to do research at Yale University; G. D. Johnson, to take over Dr. Billman's duties; C. S. Rohrer, appointed assistant professor; C. E. Kaslow and E. Campaigne, promoted to assistant professorships.

Two new positions have been created in the Department, one that of supervisor of general chemistry and the second in the field of analytical chemisty. L. J. Todd, formerly chairman of the Chemistry Department, Marshall College, Huntington, West Virginia, was appointed associate professor to fill the first position; the second is still open.

*On 23 October at the Escuela Agrícola Panamericana, Honduras,* Wilson Popenoe, head of the School, was presented a token in recognition of his important services connected with the introduction of the avocado into California. This token was made in the shape of the Fuerte Avocado, showing the Aztec symbol for an avocado tree, and was brought by Harland Griswold, president of the Avocado Society of California, who flew to Honduras for this purpose. The ceremony was attended by several distinguished guests, including U. S. Ambassador Irwin and the director of agriculture of Honduras, Mr. Ortega. On the same day Mr. Griswold was taken to see the wild form of the avocado, growing in its native forest on Uyuca peak. The Escuela Agrícola Panamericana, for the training of young men in the principles of tropical agriculture, is entirely supported by the United Fruit Company.

*A $50,000 endowment fund for the Department of Chemistry, University of Rochester,* has been established by Harry M. Hooker, chairman of the Board of the Hooker Electrochemical Company, Niagara Falls, it is announced by Alan Valentine, president of the University. The fund will be paid to the University in increments of $5,000 a year for 10 years and is to be used for general purposes of the Department under the direction of W. Albert Noyes, Jr., chairman of the Department and director of the University's Research Laboratory in Chemistry. Mr. Hooker was graduated from the University in 1894.

*The University of Tennessee, Memphis,* announces the merger of the Department of Physiology with the Department of Pharmacology to form one division under the direction of J. P. Quigley. New appointments include: R. V. Brown, formerly of the University of North Dakota, associate professor of pharmacology; James H. Wills, formerly of the University of Rochester, assistant professor of pharmacology; C. Riley Houck, formerly of New York University, assistant professor of physiology; Lester Van Middlesworth, formerly of the University of California, instructor in physiology. D. Roy McCullagh, Paul Mesaros, and Daniel A. Brody are research associates in the Department of Pharmacology.

*The Royal Society of Medicine,* London, celebrated the centenary of the first surgical operation to be performed under general anesthesia on 16 October at a special meeting of the History of Medicine Section. The meeting was followed by the opening of an exhibition by Lord Moran at the Wellcome Historical Medical Museum. Though it is generally claimed that the first use of ether in Europe was at University College Hospital, London, Dr. Underwood, director of the Wellcome Historical Medical Museum, in the current issue of the *British Medical Journal* claims to have discovered evidence that this event in fact took place in Scotland at the Dumfries and Galloway Royal Infirmary late in 1846. The celebrations of what Sir William Osler termed medicine's greatest gift to suffering humanity are commemorated in a series of articles in the *British Medical Journal,* including a reproduction of some of the earliest scientific contributions on the subject in England, published in 1847.

*Fellowships leading to a Master's degree in public health* in the field of health education are being offered to any qualified United States citizen between the ages of 22 and 40, according to a statement released by the U. S. Public Health Service, Federal Security Agency. Tuition, travel expenses for field training, and a stipend of $100 a month will be provided from funds furnished by the National Foundation for Infantile Paralysis. Candidates must hold a Bachelor's degree from a recognized college or university and must be able to meet the entrance requirements of the accredited school of public health of their choice. In addition to the degree, courses in the biological sciences, sociology, and education may be required. Training in public speaking, journalism, psychology, and work in public health or a related field are considered desirable qualifications.

The year's training, which begins with the 1947 fall term, consists of eight or nine months academic work including: public health administration, epidemiology, public health and school health education, problems in health education community organization, and information techniques, and three months of supervised field experience in community health education activities.

Application blanks may be obtained by writing the

Surgeon General, U. S. Public Health Service, Washington 25, D. C., and must be filed prior to 15 March 1947. Veterans are encouraged to apply and will be paid the difference between their subsistence allowance under the G. I. Bill of Rights and the monthly stipend of $100. Employees of local and state health departments are not eligible since Federal grants-in-aid are already available for such training purposes.

*A new manufacturing unit for the production of Vitamin $B_6$,* pyridoxine hydrochloride, will be erected at Elkton, Virginia, by Merck & Company, Inc., manufacturing chemists. Approval for the $295,000 four-building unit was granted early last month by the Civilian Production Administration at Richmond, Virginia. "Total cost of the new plants," George W. Merck, president, said, "will be in the neighborhood of $1,500,000, of which by far the greatest expense will be for equipment. There will be two process buildings, one of which is already constructed; a cooling tower and reservoir; and a small, one-story refrigeration building."

*Staff changes in the Department of Chemistry, Oregon State College,* Corvallis, include the promotion of C. S. Pease from associate to professor of chemistry, and the addition of Ralph Spitzer, formerly NRC Fellow at the University of California, as assistant professor of physical chemistry. R. L. Huston, University of California, Lillian S. Olsen, Washington State College, and Janet Bubl, recently of the Forest Products Laboratory at Madison, have been added as instructors. J. S. Jones, professor of agricultural chemistry and head of the Chemical Division of the Agricultural Experiment Station, has retired to emeritus status, and J. S. Butts, professor of biochemistry, has assumed the position thus vacated.

*The International Exchange Service,* Smithsonian Institution, Washington 25, D. C., announces that it is now accepting for forwarding to addresses in the countries listed below donated or exchange governmental, scientific, and literary publications. Countries in the Eastern Hemisphere include Africa, *Australia, *Belgium, Bulgaria, *China, *Czechoslovakia, *Denmark, *Egypt, *Finland, France, *Great Britain, Greece, India, Iran, Iraq, Ireland, *Italy, Lebanon, Netherlands, *New Zealand, *Norway, *Palestine, Philippines, *Poland, *Portugal, *Soviet Republics, *Spain, *Sweden, *Switzerland, and Syria. All countries outside of the United States and its possessions are included in the Western Hemisphere. Publications should be tied with string in unsealed packages, which, when fully prepared, should not exceed 4 pounds, 6 ounces, if addressed to destinations in countries in the Eastern Hemisphere, and preferably should not exceed 4 pounds when for destinations in the Americas. The weight restrictions do not apply to single volumes or to large lots when consigned to one address in any of the countries marked with an asterisk. Each package should bear, on the inner wrapper, the address of the foreign consignee and, in the upper left-hand corner, that of the consignor. The outer wrapper or container should bear the Washington address. Transportation charges to the above address should invariably be prepaid and a notice of shipment sent to the Institution, giving the number and total weight of the packages.

*Plates showing the segmentation of the egg of Bdellostoma stouti,* from the Bashford Dean Memorial Volume, may be secured free of charge by those interested upon application to E. W. Gudger, American Museum of Natural History, New York 24, New York.

*The Department of Physiology, The Ohio State University,* has announced the appointment of Robert S. Grubbs, formerly of George Washington University, as assistant professor, and the advancement of Emil Bozler from associate professor to full professor and of William V. Whitehorn from instructor to assistant professor.

*Nominations are solicited for the 1947 $1,000 Award,* established by Mead Johnson and Company to promote researches dealing with the B-complex vitamins. The recipient of this award will be chosen by a committee of judges of the American Institute of Nutrition, and the formal presentation will be made at the annual meeting of the Institute, 18–22 May 1947. The award will be given to the laboratory (nonclinical) or clinical research worker in the United States or Canada who, in the opinion of the judges, has published during the previous calendar year, 1 January–31 December, the most meritorious scientific report dealing with the field of the B-complex vitamins. While the award will be given primarily for publication of specific papers, the judges are given considerable latitude in the exercise of their function. It may be recommended that the prize be divided between two or more persons or that the award be made to a worker for valuable contributions over an extended period but not necessarily representative of a given year. Membership in the American Institute of Nutrition is not a requisite of eligibility for the award. To be considered by the committee of judges, nominations for this award for work published in 1946 must be in the hands of the chairman of the Nominating Committee by 15 January 1947. Those, accompanied by such data relative to the nominee and his research as will facilitate consideration of the nominations, should be sent to the following address: Robert R. Sealock, Department of Chemistry, Iowa State College, Ames, Iowa.

*The Tri-State Geological Field Conference* for Iowa, Illinois, and Wisconsin resumed activities on 26–27 October after a lapse of four years. A field trip, organized by J. H. Bretz, University of Chicago, was made in northeastern Illinois and adjacent Indiana. About 160 geologists and students from the following institutions participated: Armour Research Foundation, Augustana College, University of Chicago, State University of Iowa, Iowa Geological Survey, University of Illinois, Illinois Geological Survey, Indiana University, North Central College, Northwestern University, and University of Wisconsin.

During the Conference six localities were visited, three of which presented controversial geological problems. At the first stop a large reef or bioherm structure in the Niagaran dolomite at Thornton, Illinois, was examined. Both the core and reef-flank beds were well exposed. Its genesis and paleoecology were discussed by H. B. Willman and Heinz Lowenstamm. The second stop was made at the structural complex near Kentland, Indiana, where highly tilted and faulted Ordovician beds have been thrust over 1,500 feet up to the level of essentially horizontal Devonian and Pennsylvanian strata. Evidences for the two competitive theories of cryptovolcanism and meteoritic impact were summarized by J. T. Stark. At the third stop, in the Lehigh Stone Company's quarry near Kankakee, Illinois, a series of roofless solution cavities in the Niagaran dolomite filled with deformed Pennsylvanian strata were examined under the leadership of J. H. Bretz and Paul Herbert. Discussion centered on the question of whether the features represented a buried Karst topography or whether most of the solution was accomplished after deposition of the Pennsylvania beds. The three last localities visited were: a gravel bar of the glacial Kankakee Torrent along Kankakee Valley; an exposure of the Maquoketa formation at Wilmington, Illinois; and the famous "Mazon Creek" plant fossil beds of Pennsylvanian age near Braidwood, Illinois.

The Conference for next fall will be in the Fond du Lac region of Wisconsin and will be directed by L. N. Cline, University of Wisconsin.

*Fundamental investigations on air-borne diseases* will be conducted under the direction of A. P. Krueger, chairman of the Department of Bacteriology, University of California, Berkeley, under a contract established with the Office of Naval Research. The project will be conducted jointly with U. S. Naval Research Unit #1 and will, in addition, utilize the war-developed facilities and equipment of the latter for graduate research under the direction of Department staff members. University and naval personnel participating in current studies on comparative bacterial nutrition, aerobiology, and experimental epidemiology of bacterial and viral infections include: S. S. Elberg, H. Friedlander, A. P. Krueger, W. R. Leif, S. H. Madin, R. L. Overpeck, W. R. Perkins, M. Rockenmacher, I. L. Shechmeister, W. Waring, H. M. S. Watkins, and B. K. Williams.

*The National Registry of Rare Chemicals,* Armour Research Foundation, 35 West 33rd Street, Chicago, Illinois, lists its new needs as follows: isoguanine; promulsin; barylite; oxaldiureidoxime; azodicarbonamide; cyclohexanehexone; ethyl dithiocarbamate; thiobenzoic acid; creatinephosphoric acid; aesculetin; 1-borneol; silicon monoxide; cyclohexadiene-1,3; monochloroacetylene; ammonium sesquicarbonate; desoxalic acid; benzoylacetic acid; potassium percarbonate; hexamethylacetone; 2-acetaminoquinone; stannous acetate and tartrate; and crocin.

*A Schering Fellowship* has been established in the Department of Pharmacology, University of Tennessee, with funds provided by the Schering Corporation, Bloomfield, New Jersey. Candidates are requested to submit their application and qualifications to Dr. J. P. Quigley, University of Tennessee, Memphis, who will award the fellowship.

*The University of Michigan* has announced the following appointments to its staff: Theodore H. Hubbell, formerly of the University of Florida, professor of zoology and curator of Insects in the Museum of Zoology, effective on 1 January 1947; William Hovanitz, assistant professor of botany and research associate in the Botanical Gardens; and Claude W. Hibbard, assistant professor of geology and associate curator of Vertebrate Paleontology in the Museum of Paleontology.

*Emory University,* Georgia, announces the appointment of E. H. Still and William E. Medcalf as assistant professors of mathematics and chemistry, respectively. Jack Myers, associate in medicine, and Abraham S. Velkoff and John B. Garner, assistants in obstetrics and gynecology, were appointed to the Medical School.

*Expansion of Harvard University's Graduate School of Public Health* through two faculty appointments and the institution of two new degrees in research was announced on 26 October by James S. Simmons, dean of the School. Those joining the staff are Hugh Rodman Leavell, former assistant director of the Division of Medical Sciences, Rockefeller Foundation, and John Crayton Snyder, an expert in typhus fever. Dr. Leavell will occupy the chair of Public Health Practice which became vacant in July due to the death of Edward G. Huber (see *Science,* 1946, **104**, 166). Dr. Snyder, who will occupy the chair of Public Health Bacteriology, a new position created by the

reorganization of the School, has been a member of the field staff of the International Health Division, Rockefeller Foundation.

In addition to degrees which presuppose qualifications as Doctor of Medicine, the School has added the degrees of Master of Science in Hygiene and Doctor of Science in Hygiene, open to researchists. Thus the investigation of problems connected with public health, as well as instruction, will be augmented.

## Elections

*The Western Society for Clinical Research* held its organization meeting in San Francisco on 1–2 November. A constitution was adopted and the following officers were elected: president, Gurth Carpenter, Los Angeles; vice-president, Mayo Soley, San Francisco; secretary-treasurer, Helen Martin, The University of Southern California; and councilors, Lowell Rantz and Paul Aggeler, San Francisco; Hans Hecht and Charles McLellan, Salt Lake City; Myron Prinzmetal, Los Angeles; and Daniel Green, Seattle. A scientific program was also conducted at which 20 papers were presented.

*Bernard L. Oser,* vice-president and director of Food Research Laboratories, Inc., Long Island City, has been elected chairman of the Division of Agricultural and Food Chemistry of the American Chemical Society for 1946–47. Dr. Oser succeeds N. B. Guerrant, Pennsylvania State College.

*W. E. Petersen,* professor of dairy husbandry at the University of Minnesota, has been elected to the Royal Academy of Science of Sweden, this recognition coming as a result of Dr. Petersen's outstanding contributions to the physiology of lactation with special reference to the bovine.

*Henry S. Johnson,* dean of the College of Pharmacy, University of Connecticut, was elected president of the American Association of Colleges of Pharmacy at the annual meeting held in Pittsburgh on 25–27 August.

*The International Association of Milk Sanitarians, Inc.,* at its annual meeting, 24–27 October, took its first constitutional step in changing the name to International Association of Milk and Food Sanitarians, Inc. Final action will be determined by a mail vote within the next several months. Newly elected officers are: president, R. G. Ross; first vice-president, W. D. Tiedman; second vice-president, A. W. Fuchs; third vice-president, M. R. Fisher; and secretary-treasurer, J. H. Shrader. The Executive Board authorized that the name of the *Journal of Milk Technology,* the official organ of the Association, be changed to the *Journal of Milk and Food Technology,* effective with the beginning of the next volume.

## Recent Deaths

*Leslie L. Lumsden,* 71, pioneer in public rural sanitation, died in New Orleans on 8 November. Dr. Lumsden, an expert on plagues, retired from active duty with the U. S. Public Health Service in 1939, and in 1943 became professor of epidemiology at the University of Texas School of Medicine.

*Frank M. Schertz,* 57, biochemist, was found dead in Germany on 5 November. Dr. Schertz had gone to Europe this fall as a civilian Army employee to screen German scientific literature for the Department of Commerce.

*Willis Linn Jepson,* 79, died on 7 November. Dr. Jepson had been professor of botany at the University of California from 1918 to 1937 and professor emeritus since that time.

*Julius Wagner,* professor at a veterinary institute in Belgrade and an authority on Siphonaptera, died in Austria in 1945, according to news received from Karl Jordan, of the British Museum, by Capt. Robert Traub, of the Army Medical Center. Dr. Wagner, who was a white Russian, retreated north with the Germans in 1945. His death was the result of pneumonia contracted at that time.

*Evert Gardner Bennett,* 35, physicist, National Bureau of Standards, died on 21 October in Washington, D. C.

*Joseph Krafka, Jr.,* 56, since 1933 professor of microscopic anatomy and head of that department, University of Georgia School of Medicine, Augusta, died on 5 November. Dr. Krafka was instrumental in the founding of the Georgia Academy of Science.

## Research in the University of Hawaii Pacific Expeditions

During the half century when the islands of Micronesia were administered by Germany and Japan, few American scientists were permitted to study the area, and very little scientific material concerning them was made available in English. Such publications as did appear in Japanese and German offered relatively little information in a number of important fields of the natural sciences—notably, botany, zoology, bacteriology, and parasitology. Little is known, for instance, of the fungi and algae of these islands or of the prevalence of parasitic diseases; and no comprehensive study of either the vertebrate or the invertebrate fauna has ever been made.

Soon after these islands were thrown open to American scientists, the University of Hawaii, taking advantage of its relative proximity to Micronesia, called

upon its scientists, some of whom were veterans of research expeditions to other Pacific islands, to conduct a series of expeditions in the Micronesian region. These expeditions have produced scientific information which will be very significant, especially if these islands are to continue under the control of the U. S. Government.

The first expedition, consisting of four University of Hawaii scientists, set out in December 1945 to make a preliminary reconnaissance of the Micronesian islands. It was followed in the summer of 1946 by more intensive research expeditions planned and directed by the University's Pacific Islands Research Committee. Transportation, housing, and other facilities were furnished each of these expeditions by the U. S. Navy.

On 17 July 1946 the first of two University groups left Honolulu by air. This included Robert W. Hiatt, chairman of the Department of Zoology and Entomology; Harvey I. Fisher, assistant professor of zoology; Floyd W. Hartmann, acting chairman of the Department of Bacteriology; and two assistants, Leo Fortess and Eveni Levi. After a brief stay on Guam, the group spent nearly a month on Yap, where it conducted a comprehensive zoological exploration. Some 200 specimens of vertebrates, chiefly birds, were collected. Whereas detailed studies of the taxonomy and the distribution of vertebrate species have been previously made in surrounding areas, Yap itself has remained relatively unknown. A comparison of the avifauna of Yap with that of Guam and Peleliu will therefore throw considerable light on the movement of bird species from Asia and the Philippines eastward and northward along the Marianas chain. It is hoped that these studies may aid in saving from extinction some of the endemic vertebrate animals of these islands.

The invertebrates of Yap were likewise studied, not only to determine their distribution within the group, but to compare them with species known to exist in the Philippines and Indo-China to the west, and along the Great Barrier Reef of Australia to the south. Such comparisons may do much to reveal the dispersal of species from the Asiatic mainland eastward into the Pacific. Subtidal areas were explored by both the "skin diving" and "self-contained diving" techniques, and thousands of marine invertebrates were preserved for shipment to the University.

The bacteriological research of Dr. Hartmann centered on dental caries and a study of the incidence of leptospirosis, or Weil's disease. Bacteriological examinations were made of saliva specimens of several hundred Yap school children whose physical and dental records were made available by Navy officials. The study of leptospirosis consisted of collecting autopsy specimens of rats, and was conducted in coordination with work carried on elsewhere on the Carolines.

Joseph E. Alicata, head of the Department of Parasitology, University of Hawaii Agricultural Experiment Station, left Honolulu by plane on 18 July for a six-week visit to Truk and Ponape in the eastern Carolines. His principal goal was to determine the incidence of leptospirosis in that part of Micronesia. This study was prompted by data collected by him in the Hawaiian Islands, indicating that the disease might be widespread in Pacific areas where rainfall is unusually high and where rodents, as transmitting agents, are abundant. He trapped a number of rodents whose kidneys were examined for *Leptospirae* as an aid to the recognition and control of this disease in man. In addition, he made a study on the incidence and distribution of parasites of natives and economically important animals such as cattle, swine, and poultry.

On 7 August a group of University botanists sailed from Pearl Harbor in a Navy LSM, which served as their base through the expedition. This group consisted of Harold St. John, chairman of the Department of Botany; Donald P. Rogers, assistant professor of botany; and Richard S. Cowan, graduate assistant. Their vessel put in at Kwajalein, Likiep, Ailuk, Utirik, Mejit, and Wotje. They continued by seaplane to Namu, Jaluit, Ailinglapalap, and Ebon, investigating territory outside the scope of scientists attending Operation Crossroads at Bikini.

The aim of this expedition was to make a general botanical exploration of the limited but little-known flora of as many of the Marshall Islands as time permitted. As a means of determining the direction of ocean currents and the spread of plants, observations were made of drift logs cast up along the shores. Special attention was given to the ethnobotany of crops. For future studies in collaboration with anthropologists, crop origins will be investigated in relation to migration routes of settlers of these and other Pacific islands which form the traditional stepping stones of intercourse between Asia and the mid-Pacific. This group returned to Hawaii on 12 September, bringing photographs, motion-picture film, and over 1,000 plant specimens for study at the University and for addition to the herbarium of the Bishop Museum, Honolulu.

These expeditions initiate the series of scientific investigations outlined in the long-range plans of the Pacific Islands Research Committee of the University of Hawaii. Many of the results of these studies are to appear in the near future in *Pacific Science*, a new quarterly published by the University of Hawaii.—*Thomas Nickerson* (University of Hawaii).

# Science Exhibition

At the delayed 1945 annual meeting, held in St. Louis during the spring of this year, there was a partial resumption of the Science Exhibition sponsored by the Association. At that time it was not possible to have as large a representation of technical and scientific exhibits as in previous years because of the short notice on which the meeting was called. In Boston a much larger group of scientists and manufacturers will be represented. It is particularly gratifying to note that there will be a substantial increase in the scientific exhibits.

The Exhibition will be held in the First Corps Cadet Armory, Arlington Avenue and Columbus Street. The Armory is conveniently located in the center of Boston and diagonally across the street from the Hotel Statler, general headquarters of the convention.

The standards for exhibiting at the Association's meetings have always been high, and this year's exhibitors have qualified in every way for participation. The Association expresses appreciation on behalf of its members for the cooperation of all the exhibitors who will make this feature possible.

The local committee for the meetings is sponsoring a tea each afternoon at 4:30 in the Gun Room of the Armory. Members and their friends are invited to visit the Exhibition and enjoy this hospitality of the local committee.

Some institutions and concerns which have already decided to take part in the Exhibition were unable to send descriptive material for publication in this issue of *Science*. This is particularly true of exhibitors expected from England, South Africa, Canada, and Australia.

At our request the exhibitors have furnished us with the following descriptions of their exhibits:

## American Optical Company

**(Scientific Instrument Division)**
**Buffalo, New York**
**Booth Nos. 26–27**

The Scientific Instrument Division of the American Optical Company will have several interesting instruments on exhibit. The Phase Microscope, a recent research development, will be on display. A new Metallurgical Microscope, with coated optics, and a Microcharacter will be shown. Two Polarizing Microscopes, one in which Polaroid of optical quality replaces calcite, as well as one using calcite, will also be exhibited. A graduated quartz wedge for use with the Polarizing Microscope and other standard microscopes and instruments of the well-known Spencer quality will be on hand. Messrs. O. E. Schaefer, G. W. Frid, N. J. Blaiklock, R. A. Lowe, and C. R. Smith will be in attendance to demonstrate Spencer equipment and to discuss any optical questions presented by visitors.

## Baird Associates

**Cambridge, Massachusetts**
**Booth No. 2**

Baird Associates plan to exhibit the following equipment: *Double Beam Infra-Red Spectrometer*—This instrument will be set up and operating in the booth. It will give recorded transmission values in the spectral range, 2–15 microns; *Cabinet Model Infra-Red Gas Analyzer*—The gas analyzer will be operating and recording a continuous analysis of the $CO_2$ content of the air in the exhibit hall; *Interference Filters*—Transmission-interference filters for use in the solution of optical problems will be demonstrated. The outstanding characteristic of these filters is their narrow transmission bands which can be located in any specified wave length of the spectrum; *Hardy Dermal Radiometer*—This instrument is a radiometric device adapted to the measurement of surface temperatures. The apparatus has been used for measuring skin temperatures in humans, and the precision of the instrument is such that temperatures can be measured to $\pm 0.01°$ C.; *Surface Roughness Standards*—These surface finish standards have found wide acceptance as gages for checking the acceptable roughness of a machined surface. The set consists of 20 stainless-steel blocks machined to predetermined microinch readings. Differences in roughness as low as two millionths of an inch can be detected by tactual (fingernail) comparisons.

## Bausch & Lomb Optical Company

**Rochester, New York**
**Booth Nos. 52, 53, and 54**

"New Developments in the Field of Optical Instruments" will be the main theme of the Bausch & Lomb exhibit. Visitors will be shown demonstrations of new development projects in the field of optics and will be given an opportunity to see some of the new products planned for the future. Among these will be new microscopes which can be equipped with fluorescence and stereoscopic accessories, new photomicrographic equipment for ultraviolet work, a new combination bright field-dark field vertical illuminator, and a number of new equipments for the control of substage illumination. Technical personnel will be in attendance at the booths during exhibit hours to provide complete information on the operation and use of these new products.

## The Blakiston Company

**Philadelphia, Pennsylvania**
**Booth No. 28**

The Blakiston Company, Philadelphia and Toronto, have prepared an especially attractive exhibit of their textbooks and reference works of interest to teachers in the sciences. Extensive recent progress in various fields of scientific endeavor has been fruitful and of real significance in areas of undergraduate study. Teachers will be interested in the presentation of atomic fission, disintegration, and resulting nuclei included in the new printing of Hackh's *Chemical dictionary. The "particles" of modern physics,* by Stranathan; *Electronic physics,* by Hector, Lein, and Scouten; *Human embry-*

*ology*, by Bradley M. Patten; *Inorganic chemistry*, by W. Norton Jones, Jr.; Pregl's *Quantitative organic microanalysis*; and Stiles' new edition of the *Handbook of microscopical characteristics of tissues and organs* are some of the new books to be shown. Textbooks for full college term, semester, or briefer courses in chemistry, physics, and the biological sciences will be on display. Teachers are cordially invited to discuss textbook problems or matters pertaining to new manuscripts with the Blakiston representative. Dr. James B. Lackey, editor of Undergraduate Texts, will be in charge.

## Cargille Scientific, Inc.

**New York, New York**
**Booth No. 70**

Cargille Scientific, Inc., associated with the firm of R. P. Cargille, will exhibit the following new products: (1) Crocker-Henderson Odor Standards, developed and long used by Arthur D. Little, Inc., and commercially available for the first time. The Crocker-Henderson System, which makes it possible to evaluate any order in terms of a 4-digit number, has many important applications; (2) Hawkin's Density Gels for the rapid comparison of the densities of gems and minerals as well as other materials; replace the high-density solutions that have long been used and which are expensive and toxic; (3) Stone-Marshall Test Paper for Quaternary Ammonium Compounds, the first simple means of determining concentration of these important sanitizing agents in eating establishments, dairies, and food-processing plants; (4) Chloro-Sharp, new, simple, portable color test for determining chlorine in the concentrations of 50–200 ppm; (5) the new Cargille Spot Test Plate (40 times as sensitive as the conventional test plate) and Cargille Reagent Granules, pure reagent deposited in porous glass —convenient to handle for spot tests and provides the pure reagent in an instantly soluble form.

## Fred S. Carver

**New York, New York**
**Booth Nos. 31–32**

Fred S. Carver will exhibit their standard 10-ton Carver Laboratory Press and standard accessories. One of the unique features of the Carver Laboratory Press will be the various standard accessories available for optional use with the equipment. These include swivel bearing plates for crushing and compression tests, cage and other filtering equipment, and Carver test cylinders. Carver-designed accessories provide facilities for many kinds of laboratory testing and control work. Flexibility as to accessory equipment available is a real economy in laboratory operation. For plastic molding and hot pressing of various kinds, the press is regularly furnished with 6″×6″ electric hot plates complete with wiring, switch, and thermostatic control, for temperatures up to 400° F. Fred S. Carver's booth will have on exhibit a museum collection of test and sample pieces representative of the work done by users with the Carver Laboratory Press. Samples will include molded plastic pieces, oil and extraction samples, metallographic mountings, laminations, etc. These user-made samples show the wide range of uses and versatility of this small press and its standard accessories.

## Central Scientific Company

**Chicago, Illinois**
**Booth No. 84**

In the Cenco exhibit many new apparatus items of interest to laboratory workers are presented. For the chemist, there is the new Cenco Titration-pH Meter, Cenco Kool-Grip Flask, and Cenco-Sheard-Sanford "Photelometer"; for the physicist, the Cenco Oscilloscope, Concentrated-Arc Lamps, and Selsyn Motors; for the biologist, Hygeaire Germicidal Units, Magnifocuser, and Ultraviolet Lamps; for the meteorology instructor, the Cenco-Millar Observoscope. The Cenco Titration-pH Meter operates from 115-volt, 60-cycle, alternating-current lines. Its large, easy-to-read dial includes two ranges for pH or titration readings. Many features of convenience and safety are built into the unit. Polarity may be instantly reversed without disconnecting, measurements may be made in grounded tanks, and direct readings may be taken in the range 0–100° C. through the use of the automatic temperature compensation switch. Normal a-c fluctuations are automatically stabilized. "Cenco News Chats," reprints, and descriptive circulars will be available at the booth. Mr. R. H. Parker, manager of Cenco's Eastern Division at Boston, will be in charge and will welcome visiting scientists.

## Ciba Pharmaceutical Products, Inc.

**Summit, New Jersey**
**Booth No. 47**

Ciba issues a cordial invitation to all those in attendance to visit its booth. The featured product around which the exhibit is built is Pyribenzamine Hydrochloride. This preparation is a new antihistaminic compound of very high efficacy in the treatment of various types of allergy. Pyribenzamine is a synthetic drug, effective by mouth, and is therefore made available in the form of oral tablets. Its greatest success has been achieved in the treatment of seasonal allergic rhinitis (hay fever) and urticaria (hives). In these two conditions relief is obtained in approximately 85 to 95 per cent of cases. In bronchial asthma and nonseasonal allergic rhinitis the success rate is not quite as high but still remains impressive. Other and more rare forms of allergy are benefited in greater or lesser degree. Fortunately, serious undesirable side reactions from this drug are extremely rare. The exhibit depicts pictorially the dramatic effects of Pyribenzamine both in the laboratory animal and in the human subject.

## Clay-Adams Company, Inc.

**New York, New York**
**Booth Nos. 57–58**

The Clay-Adams exhibit will feature supplies and equipment for the biological and medical sciences; Medi-

chromes (2″×2″ Kodachromes) on the biomedical sciences; as well as the projectors, screens, files, viewers, and other accessories for use in handling the 2″×2″ Kodachromes.

## The Coleman & Bell Company

**Norwood, Ohio**
**Booth No. 66**

The Coleman & Bell Company will exhibit a representative list of laboratory reagents, including inorganic and organic chemicals, biological stains, chemical indicators, test papers, and solutions. A number of new items developed during the war will be shown.

## Thomas Y. Crowell Company

**New York, New York**
**Booth No. 45**

The Thomas Y. Crowell Company will present a display of its college texts and reference books, which are largely in the fields of chemistry, geography, and the social sciences. Featured in the Crowell booth will be three new college texts in chemistry which are scheduled for publication in January 1947. Copies of these new books will be available for inspection. The titles are: *First-year qualitative analysis,* by Carl J. Likes and Aubrey E. Harvey, Jr.; *Physical chemistry,* by Herschel Hunt; and *Semimicro qualitative organic analysis,* by Nicholas D. Cheronis and John B. Entrikin. Over 30 other books will be on display. Among these will be such recently published texts as *Basic college chemistry,* by Joseph A. Babor, and *Atlas of world affairs,* by Clifford H. MacFadden, Henry Madison Kendall, and George F. Deasy. The list will also include Spanish translations of several of the Crowell texts in the science field.

## Eastman Kodak Company

**Rochester, New York**
**Booth Nos. 50–51**

Photography's role as the aid to human perception and memory in observing, recording, and teaching is the theme of the Kodak display. The central feature is a huge photomicrograph of an etched cast-iron surface as shown by Ektachrome, the new user-processed Kodak color film. Varying phase retardation of polarized light results in imparting separate color to the metallurgical constituents and makes for conspicuous differentiation. Alongside there is to be a "live" display of crystal growth viewed by transmitted polarized light. Projected on a screen at 200× magnification, brilliant birefringence colors succeed each other as the crystal thickness changes and the polarization plane rotates in a demonstration of a principle widely used in mineral and chemical identification. Still another application of polarized light interference is to be presented in studies of photoelastic models to trace strain distribution in engineering structures. Motion pictures made at thousands of frames per second will be continuously on view to show stretched out in several minutes economically important processes that are over a second or less. Other features of the Kodak exhibit range from broad fields, such as the photovisual concept in teaching, to such specialized applications of photographic materials as in spectroscopy, mass spectrography, and electron microscopy.

## The Electrodyne Company

**Boston, Massachusetts**
**Booth No. 78**

The Electrodyne Company is engaged in research, development, and manufacturing of laboratory and industrial devices employing the principles of electronics, mechanics, and optics. Among the specially developed devices to be exhibited are a stimulator for research use, providing rectangular pulses of various durations and accurately controlled magnitude triggered from the sweep circuit of a cathode-ray oscillograph over a wide range of frequencies; a vibrometer for optical simulation of the task of reading under conditions of vibration; and an impulse-rate indicator, useful in demonstrating and studying electrical phenomena in insect and other nerves, including the effects of nicotine, DDT, etc. The Electrodyne Stimulator, now in production, is designed for use by students in physiology courses. Providing electronically generated pulses readily controlled in magnitude up to 250 volts at frequencies from 0.5 to 100 cycles per second, this instrument is more convenient and reliable than the induction coils formerly used. Other features are signal magnet operation without batteries, reversible polarity of stimulus, and a neon light for visual indication of each pulse. Members of the Electrodyne staff will be in attendance and will be glad to discuss any special instrumentation requirements or other electronic, mechanical, or optical problems for which solutions are needed.

## J. H. Emerson Company

**Cambridge, Massachusetts**
**Booth No. 75**

The Emerson exhibit will feature two important items of laboratory apparatus; the new Barcroft-Warburg apparatus and the Emerson Micromanipulator. The Emerson Micromanipulator is the only instrument of this kind on the market with the unique lever control whereby horizontal motions are so coordinated that the apparent motion of the needle under the field of a compound microscope is identical with the actual motion of the control lever. In addition to this unusual feature, it is the only manipulator which can be adjusted for high-power or low-power work. Visitors to the International Science Exhibition are invited to see the home plant of the Emerson Company, located in Cambridge.

## Gamma Instrument Company, Inc.

**New York, New York**
**Booth No. 30**

The exhibit of the Gamma Instrument Company, Inc., features a few of the scientific instruments and appara-

tus which have been introduced by this company during past years. Outstanding among them will be a complete line of Gamma automatic pH meters, the Microflex camera, and various micromanipulators with accessories. The Gamma pH meters are battery-operated machines which combine sturdy construction and easy operation with great accuracy. A new research model with a guaranteed accuracy of .01 per cent will be shown at the exhibit in addition to the standard instruments. The Microflex camera, which has attracted wide attention among people interested in photomicrography, may be used with or without a microscope and permits speedy operation by means of a built-in mirror reflex arrangement. Gamma micromanipulators are offered for research work at high magnifications (''Chambers'' model) and for chemical operations with minute quantities. More than 100 of these manipulators were used in various laboratories connected with research work on the atomic bomb. Much of this work is likely to cause a wider use of micromanipulators in chemical operations if and when knowledge of it becomes universal.

## General Biological Supply House

**Chicago, Illinois**
**Booth No. 46**

The Turtox exhibit will feature both microscopic slides and Kodachrome lantern slides, as well as new Turtox biological charts published during 1946. Microscope slides available for examination will include a number of new parasitological preparations. The new charts on display include subjects dealing with botany, entomology, parasitology, and comparative anatomy. Dr. Harvey M. Smith and Mr. A. C. Lonert will be in charge of the booth.

## General Radio Company

**Cambridge, Massachusetts**
**Booth No. 40**

The General Radio exhibit will include electronic instruments for making a wide variety of laboratory and industrial measurements. One of the most important of these is a counting-rate meter, with its associated Geiger-Müller counter for indicating directly the rate of radiation from radioactive substances. It is designed for use in nuclear physics, particularly in conjunction with radioactive isotopes. Other instruments to be displayed include stroboscopes, impedance bridges, frequency meters, a continuous-film, high-speed camera, and samples of the new line of General Radio Variacs. A machine for winding toroidal inductances, designed and built in the General Radio plant, will be exhibited in operation. Convention guests interested in General Radio equipment and its production are cordially invited to visit our plant and laboratories in nearby Cambridge.

## Gradwohl Laboratories

**St. Louis, Missouri**
**Booth No. 71**

Booth No. 71 shows the activities of the Gradwohl organization: (1) publication of a monthly laboratory guide, called the *Laboratory Digest*; (2) the manufacture of laboratory reagents, particular attention being called to the efficiency of this company's Grouping Sera, including anti-Rh serum; and (3) a training school for laboratory and X-ray technicians. Full literature and information will be furnished by the Gradwohl representative.

## Harper & Brothers

**New York, New York**
**Booth No. 29**

The Harper & Brothers booth will exhibit books from the college textbook and various trade departments, as well as from the medical book department, Paul B. Hoeber, Inc. On display will be a number of established books published in 1945 and earlier, and the following 1946 publications: *Astronomy* (4th ed.), by John Charles Duncan; *People in quandaries,* by Wendell Johnson; *Medical biochemistry* (2nd ed.), by Mark R. Everett, M.D.; *The child from five to ten,* by Arnold Gesell, M.D., and Frances L. Ilg, M.D.; *A treasury of science* (Rev.), edited by Harlow Shapley and others; *The working electron,* by Raymond F. Yates; *Primer for star-gazers,* by Henry M. Neely; *Radar,* by Orrin E. Dunlap, Jr.; *Hindu psychology,* by Swami Akhilananda; *Economics in one lesson,* by Henry Hazlitt; and *An American dilemma* (1-vol. ed.), by Gunnar Myrdal.

## International Equipment Company

**Boston, Massachusetts**
**Booth No. 90**

International Equipment Company's booth will feature the new Portable Refrigerated Centrifuge, Model RP–1. This machine permits control of temperatures inside the centrifuge guard bowl during the centrifuging process within the range of $-10°$ C. to $+10°$ C., with an accuracy of $\pm 1°$ C. Centrifuge and compressor are combined in one attractive cabinet, mounted on casters, and both units are operated from a single cord and plug which can be connected to the lighting circuit. Special accessories for use on this machine will also be displayed, including the Multispeed Attachment and high-speed heads for six 7-ml. or four 25-ml. tubes at 18,000 r.p.m.; angle heads for 15-, 50-, and 100-ml. tubes at speeds up to 5,000 r.p.m.; as well as the conventional horizontal tube-carrying heads. Also on display will be other models included in International's complete line of laboratory centrifuges.

## Jarrell-Ash Company

**Boston, Massachusetts**
**Booth Nos. 80–81**

The Jarrell-Ash Company will exhibit spectrographic equipment consisting of a Jaco-Wadsworth Stigmatic Grating Spectrograph employing a grating 4″ in diameter, a 480-cm. radius of curvature, 15,000 lines to the inch, giving a dispersion in the first order of 7 A./mm. up to 2.3 A./mm. in the third order, automatically focus-

ing from 1,800 A. to 10,500 A.; a Hilger Non-Recording Microphotometer with Galvoscale Reading Unit for measuring spectrum line densities; and a Hilger Judd-Lewis Spectrum Plate Comparator—a comparison microscope with suitable stage for examining a reference and unknown spectrum side by side in qualitative analysis. Polarimeters and refractometers will be displayed including the following Bellingham & Stanley instruments: a research Polarimeter with divided glass circle reading to .01° and two industrial Polarimeters, one with glass circle and drum reading to .05°, the other reading by vernier to .1°; an Abbey Refractometer with divided glass circle reading by estimation to the fourth decimal place from 1.30 to 1.70; and a Projection Refractometer to read indices for such poorly transmitted substances as jams, from 1.380 to 1.517 by .002. Microscopic equipment will include a Spencer Research Petrographic Microscope with spiral focusing Bertrand lens and slow-motion attachment for the stage; a Spencer Metallurgical Microscope with built-in vertical illuminator; and Stereoscopic, Research, and Medical Microscopes. A Freezing Microtome; a Spencer GK Projector; an air-cooled, 750-watt lamp projector suitable because of its high intensity, especially for colored slides; the VA Combination Projector for opaque materials up to 6″ × 6″; and standard lantern slides will be displayed.

## McGraw-Hill Book Company, Inc.

**New York, New York**
**Booth Nos. 43–44**

The McGraw-Hill booth will display not only the recent McGraw-Hill and Whittlesey House publications in the various scientific fields, but also our standard texts, handbooks, and reference materials, supplementing the 68 volumes which we are sending for inclusion in the Science Library. New catalogues will be available at the Exhibit, listing and describing the forthcoming McGraw-Hill publications—notably the M.I.T. Radiation Laboratory Series, in which so many scientists have expressed interest. McGraw-Hill representatives from all educational departments will be present.

## The Macmillan Company

**New York, New York**
**Booth Nos. 59–60**

The book exhibit sponsored by the Macmillan Company will consist of approximately 700 titles, including publications of the Cambridge University Press. In addition to undergraduate and graduate textbooks and reference works, there will be a large number of technical and scientific books of interest to the general reader. Books in the fields of various hobbies and avocations—photography, gardening, radio, outdoor life, and others—are to be represented, as are books of special interest to young readers. The major classifications will be agriculture, the biological sciences, chemistry, engineering, history and philosophy of science, home economics, mathematics, medical science, and physics. Representatives of the Macmillan Company at this exhibit will be: Mr. J. B. Bennett, Jr., science editor; Mr. C. J. Hylander, visual aids editor; Mr. Harry H. Cloudman; Mr. Joseph G. Sutton, Jr.; Mr. Richard T. Tuffin; and Mr. S. Russell Williams.

## Macalaster Bicknell Company

**Cambridge, Massachusetts**
**Booth No. 91**

The booth of the Macalaster Bicknell Company will describe the complete laboratory supply and research glass apparatus service provided by this company. The main attraction will be a complete glass-blowing exhibit, where actual work will be done daily at the afternoon sessions. All types of burners and tools used by the glass blower will be displayed and actually put to use. Supplementing this display, all visitors will be invited to visit our nearby plant, where glass-blowing, engraving, and grinding shops may be seen in full operation. Our dealership in all lines of laboratory supplies and apparatus will be shown by sample groups of items of Pyrex ware, Kimble Exax ware, Coors Porcelain ware, Mallinckrodt chemicals, Laboratory Iron ware, rubber goods, filters and filter paper, laboratory instruments of all kinds, as well as special items of general interest. We also will exhibit special apparatus of our own manufacture, including the Van Slyke Manometric Blood Gas Apparatus, the Rehberg Micro-Burette, the Krogh-Keyes Syringe Pipette, the M. B. Co. Mercury Manometer and Mercury Cleaner, and other items. We take this opportunity to welcome the convention to Boston and promise the most hospitable reception.

## The Medical Bureau

**Chicago, Illinois**
**Booth No. 15**

The Medical Bureau, an organization acting as counselor in the fields of medicine and science, will occupy Booth No. 15. M. Burneice Larson, director of the organization, will be present to confer with those interested in the completion or organization of their staffs. The records of scientists who are interested in relocating will be available to those who have opportunities meeting the requirements of the candidates. The service of The Medical Bureau is nationwide, extending beyond continental United States. Men and women of science are available for all types of positions, including those with schools and universities, hospitals and institutions, and industry.

## Merck and Company, Inc.

**Rahway, New Jersey**
**Booth Nos. 61–62**

The discovery of penicillin by Sir Alexander Fleming is now a well-known story. Since then, important strides have been made in the virtually unlimited field of antibiotic chemistry. Knowledge regarding penicillin has been refined to the extent that four individual forms, known as Penicillins G, F, K, and X, have been recognized. It is the G form that is of most importance in

medicine today, and it is this form, in high purity and without the presence of the F, K, and X entities, that is supplied as Crystalline Penicillin G Sodium Merck. Streptomycin, now also well known by the medical profession for its established value in the treatment of certain diseases, as well as its potential value in others, is the result of one of the most profound and inspiring research programs ever recorded. Streptomycin was discovered by Dr. Selman A. Waksman, microbiologist at the New Jersey Agricultural Experiment Station, located at Rutgers University. It is now being manufactured by Merck in rapidly increasing quantities, so that adequate supplies soon may be available for medical needs. Antibiotics have been chosen by Merck for this display at the 1946 meetings of the AAAS. Chemical, pharmacological, and medical information will be given. Other fields, medical and nutritional, in which the Merck Research Laboratories are vitally interested, include the amino acids, the vitamins, the sulfonamides, choline derivatives, and anesthetic agents.

## G. & C. Merriam Company

**Springfield, Massachusetts**
**Booth No. 89**

Our exhibit will display copies of Merriam-Webster publications: *Webster's new international dictionary* (2nd ed.); *Webster's collegiate dictionary* (5th ed.), in various bindings; *Webster's biographical dictionary*; and *Webster's dictionary of synonyms.* There will also be shown pamphlet material illustrating and explaining the use of the above publications. Souvenir booklets will be provided for those who visit the booth.

## The C. V. Mosby Company

**St. Louis, Missouri**
**Booth No. 63**

The C. V. Mosby Company will exhibit its scientific publications in its booth. Among the newer editions to be displayed will be the following: Kleiner's *Human biochemistry*; Dougherty-Lamberti's *A textbook of bacteriology and immunology*; Beaver's *Textbook of general biology*; Kleiner-Dotti's *Laboratory instructions in biochemistry*; McClendon's *Physiological chemistry*; and Zoethout-Tuttle's *Textbook of physiology.* Visitors to the convention are cordially invited to inspect these and other popular Mosby text and reference books.

## The National Geographic Society

**Washington, D. C.**
**Booth Nos. 67–68**

The exhibit of the National Geographic Society will show four pieces of apparatus used last summer by the Cosmic Ray Expedition, sponsored by the Foundation. The apparatus was carried in a B–29 which flew at altitudes of from 4,000 to 35,000 feet, between the Canadian border and the Magnetic Equator. The pieces of apparatus to be displayed are as follows: (1) apparatus comprising a battery of cosmic-ray Geiger counters arranged in a manner analogous to optical telescopes, to record the intensity of the penetrating part of the vertical cosmic radiation. Two systems of recording were used. The first comprised a set of dials to record the rays received by the telescopes. The second utilized moving photographic paper on which was imprinted a mark for every ray received. The same paper also photographed the dials; (2) apparatus demonstrating the principle of cosmic-ray telescopes, and comprising three Geiger counters (set A) out of line and three (set B) in line. Each counter lights its own individual lamp when discharged by a cosmic ray. Only by the rare event of three rays arriving simultaneously can all three lamps of set A be simultaneousl lighted. However, in set B, the three lights shine simultaneously whenever a single ray passes through all three counters; (3) a Geiger counter arranged to demonstrate the detection of various kinds of radiation, including ultraviolet light; and (4) a special type of Geiger counter called a proportional counter, so arranged as to light a white light when it is discharged by a photon, a red light when it is discharged by a cosmic ray, and a green light when it is discharged by an alpha particle. The exhibit also will include a scale model of the B–29 airplane used in the expedition. The model is a Boeing-designed, Bell-built, B–29 Superfortress.

## The New York Medical Exchange

**New York, New York**
**Booth No. 86**

It is suggested that you visit Booth No. 86, where representatives of The New York Medical Exchange will be glad to talk with you and suggest opportunities open in your field. Then too, if you wish to secure any well-trained and qualified personnel for any openings that you may have existing at the time of the convention, advice and counsel will be given in an intelligent and courteous manner. In 1926, The New York Medical Exchange was established to assist scientific and medically trained people to find happy, congenial, and satisfied occupation. Perhaps we may have exactly the position you are seeking.

## Polaroid Corporation

**Cambridge, Massachusetts**
**Booth Nos. 72–73**

The Polaroid Corporation booths will contain displays of natural polarizing crystals and synthetic polarizing sheets. These displays will include the early synthetic sheet polarizers made of iodoquinine crystals and the later types made of polyvinylalcohol and polyvinylene. Visitor-participation demonstrations of several applications of the properties of polarizers will also be set up in the Polaroid booths. Three-dimensional vectographs will be displayed. A novel feature of the vectograph display includes a representation with models of the principles of stereoscopic perception and its application in vectography. During the war, Polaroid Corporation developed a practical process for manufacturing precision optical elements of plastic. The fabrication technique of this process is to be presented at the exhibit,

and samples of precision elements will be shown. Exhibition visitors are invited to see a new motion picture in color, entitled "Light Control Through Polarization." The film will be shown twice daily at the Polaroid plant in Cambridge during the week of the Exhibition.

## W. B. Saunders Company

**Philadelphia, Pennsylvania**
**Booth Nos. 55–56**

The W. B. Saunders Company exhibit will include a complete line of textbooks and reference books dealing with the medical and biological sciences. Of special interest are the new editions of Arey's *Development anatomy*; Howell-Fulton's *Textbook of physiology*; Harrow's *Textbook of biochemistry*; Marshall and Lazier's *Introduction to human anatomy*; Greaves and Greaves' *Elementary bacteriology*; Rand, Sweeny, and Vincent's *Growth and development of the young child*; and the new manuals: McClung's *General bacteriology laboratory manual*; and Millard and Showers' *Laboratory manual of anatomy and physiology*. The representatives present during the convention will be: Messrs. John A. Behnke, Paul K. Schneider, J. P. Hughes, and E. R. Zieber.

## Schwarz Laboratories, Inc.

**New York, New York**
**Booth No. 82**

Schwarz Laboratories, consulting chemists and manufacturers of fine chemicals, will feature a sample display of yeast nucleic acid derivatives and other fine chemicals produced in their laboratories. Molds and the enzymic preparation, Polidase, produced by the growth of these molds, will also be on display. In addition, two instruments developed by the laboratories will be featured: (1) new apparatus for quick and accurate measurement of carbon dioxide and the air content of bottled beverages, and (2) Lipeometer Fat Tester for testing the fat or oil content of expeller cake, seeds, beans, and meats. Our representative will be glad to discuss with you your fine chemical requirements and to offer their services in any problem on food technology which you may have.

## The Science Press Printing Company

**Lancaster, Pennsylvania**
**Booth Nos. 41–42**

The Science Press Printing Company prints about 40 scientific journals and will have copies of these on exhibit, not only to show the extent of the work of The Science Press Printing Company, but to make it a sort of headquarters for our editors, who are welcome to use our booth at any time. We print many books as well as periodicals, and they also will show the printing which emanates from the press. We shall be glad to be of service to those attending the meeting and to discuss their printing problems with a view to working with them on printing a journal or book. The Science Press Printing Company during the war period succeeded in keeping a fairly regular schedule. We are confident for the future, because we know that the editors with whom we are dealing have complete confidence in our knowledge of the importance of the scientific printed matter. We hope that we can continue to serve science through the printed word for many years to come. Attendants at the booth will be Mr. Jaques Cattell, our president, and one of his printing assistants.

## The Seoscope

**Delaware, Ohio**
**Booth No. 85**

The Seoscope—Tomorrow's micro-projector is here today. The improvements in the field of optics as well as new discoveries during the past war are almost unbelievable to those not familiar with the field. This is partly due to the combined use of our huge government agencies and funds along with the regular optical research laboratories. Realizing this great advance and at the same time being fully conscious of the need for a better microprojector, we have spared no cost in obtaining the very best possible combination of light source and optics. These have been incorporated in an entirely new projector designed around the light-optics combination so as to secure nearly perfect utilization of these components. At the Boston meeting we will feature the projection, on a screen at a distance, with remarkable clearness of image and fidelity of detail such phenomena as the circulation of blood, heart beat, polarized light with interference figures, chemical reactions such as displacement of metals, etc. This projection can be observed by an audience such as a class or lecture group, and each member of the audience is able to observe the same specimen at the same time as it is presented by the instructor. Other uses such as projection of film strips, serving as a complete optical bench, etc. will be demonstrated.

## Serdex, Inc.

**Boston, Massachusetts**
**Booth No. 74**

The Serdex hygrometric element will be shown as an actually working part of various types of recording meteorological equipment. The exhibit will also have a complete ground station for reception of chronometric radiosonde signals and other complete sondes for specialized purposes. Visitors to the Exhibition and the AAAS meetings are cordially invited to the offices and plant of the company, located in Boston.

## Sparkler Manufacturing Company

**Mundelein, Illinois**
**Booth No. 48**

Sparkler Manufacturing Company will display stainless-steel Horizontal Plate filters in various sizes, from the small Spa Filter-Purifier for domestic, office, or laboratory use to large industrial process filters. The principle of horizontal plate filtration will be illustrated by a glass-walled laboratory model with plates installed. Production models on exhibit will be the Model 14–D–4, with a capacity of 400 G.P.H.; the Model W–8–2, with a capacity of 180 G.P.H.; and the Model W–5, with a capacity of 60 G.P.H. The Spa display consists of

a nickel-plated Spa Filter-Purifier mounted on a faucet backed by a sheet of polished stainless steel.

## The University Presses

**Chicago, Illinois**
**Booth No. 22**

The exhibiting of books from university presses is an outgrowth of the American Association of University Presses. Each press represented is a separate publishing company devoted to the production of important technical and scholarly works which might otherwise go unpublished, as well as general books of vital interest to all Americans. Because of their common goal and because some of them are too small to sponsor exhibits alone, these presses have combined to present their books in a single group.

## Ward's Natural Science Establishment, Inc.

**Rochester, New York**
**Booth Nos. 69–70**

Ward's exhibit will feature new teaching materials which the Establishment has developed. It will include new models; a beautiful Animal Kingdom chart in full color; embryological, zoological, and entomological specimens embedded in plastic; plastic corrosion preparations; a new fluorescent lamp for displaying minerals; and many other new items. Ward's will introduce at its exhibit a new preservative which is destined to replace formaldehyde in the preservation of biological specimens. This wonderful new fluid does not affect the skin or mucous membrane of the worker, has a pleasing odor, retains the natural color of the animal structures, and gives perfect preservation. Ward's considers this new preservative one of the most outstanding developments in anatomical and zoological technique in the past 50 years.

## W. M. Welch Manufacturing Company

**Chicago, Illinois**
**Booth No. 1**

The following scientific equipment will be on display: laboratory apparatus, including vacuum pumps, electric meters, tubular rheostats, resistance boxes, photometers, balances, chemical apparatus, biological apparatus, specimens, mounts, models, and slides; charts, including those for physics, chemistry, and biology, Metric Chart, Aeronautics Charts, Eye Test Charts, Electromagnetic Radiations Charts, Spectrum Chart, Periodic Chart, Transmutation Chart, Chart of Metals, Atomic Weight Chart, Electrochemical Series Chart, Bunsen Burner Chart, Organic Chemistry Chart, Atomic Structure Chart, Botany and Zoology Charts, and Physiology Charts; and laboratory manuals—a new plan of publishing your own laboratory manual for all science subjects.

## John Wiley & Sons, Inc.

**New York, New York**
**Booth No. 65**

Members of the AAAS will have an opportunity at the 1946 meeting to examine at first hand many of the most recent and significant publications of John Wiley & Sons. Wiley will have on display over 200 titles in the various fields of pure and applied science, including biology, chemistry, physics, psychology, agriculture, geology, and geography. Representatives of the firm will be on hand to answer questions and discuss matters of interest with members of the Association. Among the books featured in the exhibit will be *The path of science*, by C. E. Kenneth Mees, vice-president in charge of research at the Eastman Kodak Company. This book presents the development of the scientific method against the background of history, with particular emphasis on the growth of biology, chemistry, and physics. It is a revealing analysis of present-day organization of scientific research, applications of science in industry, and the relation of science to society. Another work to be shown is the long-awaited *Russian-English chemical and technical dictionary*, by Ludmilla Ignatiev Callaham, which will be published shortly before the meeting. Wiley feels that, with the increasing importance of technical literature from the Soviet Union today, this book will find wide use in scientific circles. Other titles featured will be: Gregory and Shave's *The U.S.S.R.—A geographical survey*; Porter's *Bacterial chemistry and physiology*; and the second edition of Clark's *Photography by infra-red*.

## Williams & Wilkins Company

**Baltimore, Maryland**
**Booth No. 83**

The Williams & Wilkins Company will exhibit new books and the latest editions of their established textbooks in anatomy, histology, embryology, pathology, bacteriology, biochemistry, physiology, and other allied medical sciences, as well as their up-to-date reference works for the research worker. In addition, their group of more than 20 scientific periodicals will be on display.

## Atomic Energy

**American Chemical Society**
**Washington, D. C.**

The American Chemical Society exhibit on nuclear energy consists of 12 panels, each telling dramatically about one aspect of the research involved in "splitting the atom." Some of the panel titles are: "Thermal Diffusion," "Centrifugal Separation," "Nuclear Fissions and Chain Reactions," and "Electromagnetic Separation."

## Lead in Air Analyzers

**Ethyl Corporation**
**Baton Rouge, Louisiana**

The Ethyl Corporation exhibit will contain two pieces of equipment for the analysis of minute amounts of tetraethyl lead in air; both are sensitive to a few micrograms of lead per cubic foot of air; both utilize the dithizone method. The first machine is a manually operated, portable field kit analyzer capable of making a lead deter-

mination in eight minutes, which is a decided improvement over previous methods. The second is an automatic analyzer which makes and records lead readings every six minutes. It is planned to demonstrate the field kit analyzer by periodically making actual lead determinations. The automatic analyzer will be operated continuously. The operation of both will be explained verbally and by means of descriptive signs. This exhibit should be of great interest to all concerned with the determination and the prevention of lead contamination in air.

## Weather Instruments

**U. S. Weather Bureau**

**Boston, Massachusetts, and Washington, D. C.**

The U. S. Weather Bureau will exhibit the latest instruments available with emphasis on those instruments that are used in solar radiation and upper air work. It is intended to have as many of these instruments as possible showing an active operation. In addition, it is planned to have a ceilometer recorder operating, using a small dummy projector as the light source, and operating teletypes showing the modern method of collection of weather reports. If possible, there will be a demonstration of facsimile transmission of weather maps. Since several fields of work are to be demonstrated, it is planned to have specialists in each field available for demonstration purposes.

## Brazilian Botanical Paintings of the Early 19th Century

**Flora de Campos-Porto Castaño Ferreira**

**Rio de Janeiro, Brazil**

This exhibit will feature a large number of the original water colors, done on parchment in the early part of the 19th Century, by Pancrace Bessa for the French periodical *L'herbier général de l'amateur*. Made by order of Charles X of France, the complete set of 500 paintings was presented as a New Year's gift in 1826 to his daughter-in-law, the Duchess of Berry, who was the sister of Teresa Christina, second empress of Brazil. The 500 paintings have now been in Brazil for about a century. Since 1922 they have been in the possession of Paulo Campos-Porto, former director of the Botanical Garden of Rio de Janeiro. They have been brought to North America by his daughter, Flora de Campos-Porto Castaño Ferreira, who will be in attendance. These paintings rank among the finest of an era in which this type of art reached its zenith of perfection.

## Electronic Drying for Moisture Determination

**Paul D. Zottu and Wilfrid L. Atwood**

**Newton, Massachusetts**

This exhibit undertakes to demonstrate rapid drying of many types of materials for moisture determination in contrast to the usual method of moisture determination by the hot-oven method. Usually the most difficult materials to dry are in the class of nonconductors or dielectric materials. Heating by any surface method is extremely slow due to the nature of the materials, and since the water is removed in the form of steam, the slow heating involves long periods of time. In this exhibit visitors will see a small electronic generator used to apply heat by dielectric means. By this method the heat is generated in the material itself by means of molecular friction which eliminates the problem of heat transfer. Electronic heating generates steam uniformly throughout the material and equalizes the pressure for removal.

## The National Bureau of Standards

**Washington, D. C.**

Three representative phases of the Bureau's work will be presented in the exhibit, which will consist of (1) The Making of Optical Glass, (2) Ionospheric Studies, and (3) Research in Hydrocarbons. The optical glass exhibit will show through photographs and specimens the making of optical glass in the experimental glass shop of the Bureau, which made large quantities of special optical glass for the armed forces. The steps include showing the raw materials, melting of the glass, cooling of the pots, inspection, molding, and annealing. Samples of pressed shapes and also the ground and polished elements will be part of the display. The ionospheric exhibit will show the location of the world's ionospheric stations and the organization of the Radio Propagation Division of the Bureau. The significance of the ionospheric research will be indicated pictorially by presentation of the behavior of radio waves in relation to the ionospheric layers. The gathering, analysis, and summation of ionospheric data is to be shown through the use of photographs and charts, as well as the dissemination of the results. The research on hydrocarbons exhibit will feature the cooperative work of the National Bureau of Standards and the American Petroleum Institute, which maintains two research projects at the Bureau. A phase dealing with the analysis of hydrocarbons will be illustrated with a flow sheet showing the isolation of individual hydrocarbons from a typical petroleum fraction by the physical processes of distillation (both regular and azeotropic), and adsorption, extraction, and crystallization. A second phase will deal with the purification of hydrocarbons in the preparation of Standard Samples. The sources of the starting materials, the method of purification, the method of establishing the purity of the finished product, and the method of sealing each sample in vacuum will be shown diagrammatically and pictorially. The third phase outlines the procedure leading to the final compilation of a complete self-consistent set of tables of selected values of physical and thermodynamic properties of hydrocarbons, and to catalogues of selected spectrograms and spectral data. Typical tables, spectrograms, and published reports of investigations will be used.

## National Roster of Scientific and Specialized Personnel

**U. S. Employment Service, Department of Labor**

**Washington, D. C.**

This exhibit will include poster displays of the work of the National Roster. In addition, copies of the various

publications of the Roster will be available for limited distribution. These publications include a considerable number of bulletins of an occupational and vocational guidance nature covering the various professional fields. Also included will be bulletins providing statistical information concerning the professions. A chief objective of the exhibit will be to provide the professional personnel attending the meetings with a fuller understanding of the services which the Roster can make available to them.

## A Fungus Enemy of Future Forests—White Pine Blister Rust

**Philip L. Rusden**
**U. S. Department of Agriculture**
**Cambridge, Massachusetts**

This exhibit will be based upon original observations over a period of eight years showing the regeneration of eastern white pine on New England areas laid waste by the September hurricane of 1938. Regeneration of wild currant and gooseberry bushes, alternate hosts of the blister rust fungus, has been studied in relation to these new stands of pine. The interrelation of the two groups of host plants has in many cases made conditions ideal for the rust. The observations are applicable not only to the thousands of acres of new pine coming in on hurricane-swept areas but also on the equally impressive large acreage of new white pine following the extensive and rapid depletion of our eastern white pine forests to meet wartime demands for lumber. Present postwar demands continue to take their toll of standing merchantable and near-merchantable trees. The back panel of this exhibit will depict a composite scene to show how the blister rust may become a serious menace to the white pines seeded in on the hurricane-swept areas or on similar areas where the mature trees have been cut off. Labels will explain the principal features of the backdrop picture, while side-panel illustrations will tell the detailed life story of the blister rust fungus. Living and preserved specimens of infected pine and currant and gooseberry (*Ribes*) plants will be used to acquaint visitors with the pathology of the white pine blister rust fungus. From time to time a series of $2'' \times 2''$ color slides will be projected in the booth to further explain the nature of the study and to show the method of controlling the blister rust disease. Emphasis will be placed upon the importance of the study of hurricane-devastated areas in New England which constitute the basis of the study. Basic data and explanatory notes will be passed to visitors interested in the story told by the exhibit.

## Science Service

**Washington, D. C.**

The exhibit will show the variety of work done by Science Service in the popularization of science. This includes: services to newspapers—Wire Service, Daily News Report, Wire by Mail, Science Page, Your Health —Here's How, Star Map, Science Shorts, and Isn't It Odd?; *Science News Letter*, the weekly summary of science covering new developments in 137 science subject classifications; *Chemistry*, the monthly magazine of new developments in chemistry, edited to serve intelligent laymen, industrialists, teachers, and students of science; Things of Science, the monthly kits of practical exhibits, experimental materials, and instructional information in what is new in science; FUNdamentals of Science, the kits designed for 10- to 15-year-old experimenters, containing all the apparatus necessary for carrying out dozens of experiments, for which careful directions are given; books edited and published by Science Service; magazine articles by members of the staff; Science Clubs of America, the materials now being sent at no cost to the more than 10,000 sponsors of clubs affiliated with Science Clubs of America, the international organization for young scientists which now numbers more than 250,000 members; the Annual Science Talent Search for the Westinghouse Science Scholarships, conducted by Science Clubs of America, which is an open competition to high school seniors; Science Clubs of America Cooperators, the work of the 37 cooperating organizations now working with Science Clubs of America to provide opportunities for young scientists in 31 states; Adventures in Science, a weekly nationwide broadcast by Science Service over the Columbia Broadcasting System, a portion of which is devoted to an open meeting of Science Clubs of America; and Science News of the Week, a compilation of the scientific developments of the week which is prepared for use by any radio station. Members of the staff of Science Service who will be present at the meeting include: Watson Davis, director; Mrs. Helen Davis, editor of *Chemistry*; Dr. Frank Thone, staff writer in biology; Miss Martha Morrow, editor of the Science Page; and Miss Margaret E. Patterson and Henry Platt, Science Clubs of America.

## National Foundation for Infantile Paralysis

**New York, New York**

This exhibit will consist of seven individual panels. *Virus Research* represents studies conducted at the Stanford University School of Medicine under the direction of Dr. Hubert S. Loring, associate professor of biochemistry, and shows methods of purification and determination of characteristics of the poliomyelitis virus. *Body Mechanics*, developed from studies conducted at the University of California at San Francisco under the direction of Drs. Verne T. Inman, John B. Saunders, and LeRoy C. Abbott, is a graphic visualization of the rhythm of action of muscles of the shoulder joint. *Epidemiology*, based on studies conducted at the University of California, the George Williams Hooper Foundation, under the direction of Drs. Karl F. Mayer, W. McD. Hammon, W. C. Reeves, and Walter N. Mack, is a visual demonstration of the host factors and transmission of poliomyelitis, the epidemiology, and the differential diagnoses of the St. Louis and Western equine encephalitides. *Pathology*, based on studies conducted at the Stanford University School of Medicine under the direction of Dr. Harold K. Faber, and research conducted at Johns Hopkins University under the direction of Drs. Kenneth F. Maxey, Howard A. Howe, and David Bodian, shows the distribution of

poliomyelitis lesions and sources of virus recovery in the human and presents the chromatolysis of nerve cells. *Muscle Function* represents the results of studies conducted at Massachusetts General Hospital under the direction of Drs. Robert Schwab, Mary A. B. Brazier, and Arthur L. Watkins, and shows electromyographic and ergographic studies of muscle function in normal and paralyzed muscles. *Treatment,* developed from studies conducted at Stanford University, Division of Physical Therapy, under the direction of Miss Lucille Daniels and staff, as well as Drs. William H. Northway and E. B. Shaw, and the Committee on Diagnosis of the National Foundation for Infantile Paralysis, shows the acute diagnostic signs of infantile paralysis, the phases of treatment, and techniques of muscle testing. *Orthopedic Surgery Rehabilitation,* representing some of the studies completed at the Orthopedic Hospital, Los Angeles, under the direction of Dr. Charles L. Lowman and consisting of a series of translights showing "before and after" views of actual cases, provides visual evidence of correction of orthopedic deformities through orthopedic surgery.

## Important Tropical Parasitic Diseases

**Willard H. Wright**
**Zoology Laboratory, National Institute of Health**
**Bethesda, Maryland**

This exhibit is designed to present the most interesting features relative to important tropical parasitic diseases, including Chagas' disease, filariasis, schistosomiasis, leishmaniasis, and onchocerciasis. The distribution of these diseases will be given in the exhibit, and methods of transmission of the parasite from host to host presented. The control and treatment of each of the infections will be covered. The exhibit, being prepared on the basis of original paintings covering the different phases, has not been presented elsewhere. It is designed primarily to present an over-all picture of this field with no undue emphasis being placed on detailed scientific matter.

## Forest Maps and Aerial Photographs

**Stephen H. Spurr and C. T. Brown, Jr.**
**Harvard Forest, Harvard University**
**Petersham, Massachusetts**

This exhibit will feature two closely related topics: (1) a series of maps showing historically changes in land use and forest composition of a portion of the Harvard Forest, and (2) recent research in mapping and in estimating the volume of forests from aerial photographs. The Harvard Forest is perhaps the oldest intensively managed piece of forest land in this country, and the map series constitute possibly the best-recorded forest succession in this country. The nine maps are on an identical basis and are done with a constant coloring scheme. These include a detailed soils map; maps showing the land use and forest composition in 1830, 1880, 1908, 1919, 1929, 1937, and 1946; and a map showing the ultimate expected forest composition. Each map will be illustrated by a photograph of the corresponding Harvard Forest model. The 1946 map was prepared by the aerial technique demonstrated, and a brief cost and accuracy note will tie together the two topics of the exhibit. This map series, which has just been completed and has not been exhibited previously, will serve as the basis for a paper to be delivered before the meetings. The aerial photography exhibit will include recent developments in this field by the Harvard Forest, including a new technique of infrared photography, a simplified stereoscopic mapping instrument, a simplified instrument for measuring tree heights on aerial photographs, and the photomensurational approach to aerial timber cruising now being studied. Illustrative photographs will show a portion of the same area covered by the maps, and will include a series of photographs of the same area taken by panchromatic, color, and infrared photography.

## Three-dimensional Weather Models

**U. S. Naval Aerological Section**
**United States Navy**

The exhibit of the U. S. Naval Aerological Section presents three units, all showing three aspects of the weather. *The World of Clouds* shows various stages in the formation and development of clouds in the atmosphere and the basic types of clouds encountered. *The Cold Front* illustrates the structure, cloud formations, and weather associated with the typical cold front of midlatitudes. *The Tropical Cyclone* gives an excellent picture of the structure and weather of a tropical cyclone, or hurricane, at the peak of its development. The models are mechanically actuated with special illumination effects so that the origin of these weather phenomena are easily traced.

## Useful Electronic Instruments

**Con Fenning, M.D.**
**University of Utah**

This exhibit demonstrates the use of electronic instruments such as the modulated RF generators, Capacigraph, moisture meters, and foreign body locators. In addition to the operation of individual instruments, there will be combined and associated circuits from which readings will be taken. These results, with other important data, will be presented in chart form.

## Map Projection Demonstration Apparatus

**Robert F. Collins**
**Smith College**

The exhibit consists of a self-contained instrument for demonstrating optically the simpler geometry of map projections. It is equally valid for gnomonic and stereographic projections of spherical segments on the developable surfaces of cylinders, cones, and planes. The instrument is ingenious rather than complex, and the best demonstration is for the visitor to operate the apparatus himself. This is entirely feasible and should proceed without disturbing others. An attendant will be available to provide instruction, conversation, and debate.

# Letters to the Editor

## On the Etiology of Clubbing of the Fingers

A common genesis for the development of clubbed fingers has long been sought. Its frequent occurrence in anoxic states, such as congenital heart disease with cyanosis, severe emphysema, chronic mountain sickness, etc., seemed to indicate anoxia as a basic cause. However, the development of clubbing in various chronic infections and in certain neoplastic states appeared to make the anoxia theory untenable, and as a result many theories have been proposed, the most recent based on increased peripheral flow (M. Mendlowitz. *Medicine*, 1942, 21, 269).

On the basis of readily observed clinical data, it is possible to postulate an anoxic factor in the infectious and neoplastic states, thereby offering a unified theory of pathogenesis. In these conditions the sedimentation rate of the blood is increased, which in turn is dependent on the formation of rouleaux. Intravascular rouleaux having been observed, it is apparent that the diffusion surface per unit of hemoglobin is reduced. The vasodilation incident to chronic anoxic states and the a – v anastamoses probably serve to facilitate the circulation of the rouleaux. With rapid rates of blood flow, tissue anoxia may exist in infections and neoplasms though the arterial saturation is normal. This provides the same mechanism (tissue anoxia) for clubbing in these states as in the classical cases of arterial anoxia.

An extension of these remarks will appear elsewhere.

EDGAR F. MAUER

*School of Medicine, University of Southern California, Los Angeles*

## Exploration for "Big Bones" at Lower Blue Licks Spring, Kentucky

Proposing to continue the exploration for Pleistocene vertebrate fossils begun last year (*Science*, 1946, 103, 58), a party from central northern Kentucky, southwestern Ohio, and southeastern Indiana led by Maj. Victor K. Dodge, gathered at the former old salt spring in the Licking River valley at Lower Blue Licks in Nicholas County, Kentucky, early on the morning of 15 September 1946. As on the previous occasion Maj. Dodge sponsored the project, paying all costs personally. The writer was present upon invitation of Maj. Dodge; other assisting personnel present were Charles E. Snow, anthropologist, and William G. Hagg, archeologist, both of the University of Kentucky, Lexington, Kentucky.

At 9:00 A.M. a bulldozer with a 12-foot blade, engaged especially for the project, began the removal of the soft river bottom alluvium over a 40-foot strip about 18 feet N. 70° E. of the walled enclosure of the famous old salt spring, the flow of which ceased about 1897. At varying depths ranging from 18 to 26 inches in the first cut made by the bulldozer, a soft, yellowish, sandy, pebbly loam containing small limestone slabs, and rotten wood, all probably of early Recent age, gave up quite a number of scattered, disconnected, frequently fragmental buffalo, deer, elk, and other contemporary fossil bones. Beneath this a sharply defined bed of dark gray or blackish river sand containing small, occasional pebbles of chert and limestone and Pottsville quartz pebbles, produced a number of buffalo, deer, and perhaps other bones. This bed of loose sand was very evidently water deposited and of fluvial origin. Its dark color was evidently derived from a former, age-long impregnation of the sulphur-saline waters of the nearby old salt spring together with some amount of iron in solution.

Beneath this bed of sand and clearly separated stratigraphically from it was found 20–21 inches of a hard, blackish, sandy, fluvial gravel containing numerous rounded quartz and chert pebbles of small size and many small, smooth, and somewhat flattened limestone slabs of cobble size or slightly larger. This bed rests directly upon the smooth, somewhat broadly water-grooved, bedded and in-place lower Cynthiana limestone. It was this hard, black, coarse semiconsolidated gravel, lying just above the limestone, that produced the proboscidian bones found in Cuts No. 1 and No. 2 on the southwest side of the salt spring in the fall of 1945. In this first cut of 1946 this heavy black gravel bed produced only a scattering of bison, elk, and deer bones; the much desired osseous relics of the *Mastodon* and the *Mammoth* were not found. Cut No. 1 was 52 inches deep, as measured from the surface to the solid bedded limestone.

In the course of the day's exploration five separate cuts were made by the bulldozer. Each of these was 12 feet wide and from 30 to 50 or 60 feet long. Cut No. 2 was made 6 feet northeast of No. 1. It produced only the usual assortment of buffalo, deer, and elk bones. Cut No. 3, set 15 feet S. 35° E. of the walled spring, was similarly unproductive, turning up only one well-preserved but broken *Mastodon* molar. During the process of excavating Cut No. 3, which was abandoned at a depth of 57 inches, it became increasingly evident that it had been previously opened in part, probably by Thomas W. Hunter (deceased), by means of hand-dug trenches during the period 1897–1900. He procured many excellent bones and tusks of *Mastodon americanus* and *Elephas primigenius* as well as skeletal relics of the buffalo, deer, elk, and other animals, most of which are now on display in the nearby Blue Licks State Park Museum.

In midafternoon, Cut No. 4, located about 28 feet S. 35° W. from the walled curb of the old salt well, was opened in a narrow undisturbed area between Cuts No. 1 and No. 2 of 1945. This cut, 56 inches deep, turned out to be very productive of proboscidian fossils in the hard, black, coarse gravel bed overlying the bedded lower Cynthiana (Ordovician) limestone. Besides the usual assortment of buffalo, deer, and elk bones at upper levels, there were found in the bottom of the cut three large

tusks, two large limb bones, several vertebrae and ribs, and one lower mandible with molar in place. Two of the tusks were evidently those of *Mastodon americanus*; one, larger and more curved, was probably derived from *Elephas primigenius*. The writer measured one of the highly curved—*Elephas*—tusks when about half excavated in the gravel bed at 56 inches. The recovered mandible, identified by the incased tooth, was that of the *Mastodon*. Other "big bones" recovered here in whole or as fragments may simply be loosely defined at present as proboscidian. Of the three tusks found, two were so soft and decayed that they fell into fragments during hand excavation. One, probably that of a young male *Mastodon*, was removed in two parts and presents a fine tip, which is frequently not well preserved. This tusk exhibits a small amount of planation, perhaps by running spring water a few inches from the tip. Toward the close of the day Cut No. 5, 18 feet N. 55° W. of the curbing of the old salt spring, was opened like the others but was unproductive.

In the course of the operation throughout the day each of the five cuts opened was refilled and the surface brought back nearly to normal as soon as the hand exploration was finished.

Altogether, 20 laboratory storage trays of the Museum of the University of Kentucky at Lexington are now filled with the vertebrate fossil material recovered during the one-day exploration of 15 September 1946. The individual bones and fragments of bones, as yet uncounted, probably number 200 or more. Besides these relics, which in time will be cleaned and prepared for museum, exhibition, and educational purposes, a considerable number of bones and some teeth of lesser consequence and value were picked up and removed by various individuals—mostly curiosity hunters—during the course of the exploration. As far as is now known no American Pleistocene species heretofore unknown to this area were found, nor were any undoubted Paleolithic artifacts discovered in the black, hard gravels.

It was estimated that between 600 and 650 people viewed this "fossil hunt."

WILLARD ROUSE JILLSON

*Frankfort, Kentucky*

## The Immunizing Effect in the Action of Trypanocidal Agents

The results recently reported by Mayer and Brousseau (*Proc. Soc. exp. Biol. Med.*, 1946, 62, 238) afford a confirmation of the viewpoint advanced by Reiner and Leonard (*Arch. int. Pharm.*, 1933, 44, 434) that, in the treatment of trypanosomiasis with certain trypanocidal drugs, a response of the host defense mechanism, an immunizing effect, contributes as a factor in the sterilization of the host. Reiner and Chao (*Amer. J. trop. Med.*, 1933, 13, 525) reported the immunization of rats to *T. equiperdum* by the use of vaccines of p-benzoquinone-killed and also of neoarsphenamine-treated trypanosomes. Strong trypano-agglutinins and lysins appeared demonstrable *in vitro* by their action on motile, virulent parasites. The immunity was shown to be strain specific. Immunized rats reinoculated with trypanosomes always survived longer than normal rats, but it was difficult to sterilize infected rats with the vaccines alone. A smaller than normal dose of an arsenical given in addition to the vaccine could, however, wipe out the infection. The serum of rats with progressed trypanosomiasis which were treated with arsenicals also showed the agglutinating and lytic effects, not shown by normal rat serum.

Mayer and Brousseau, working with mice, have apparently rediscovered this action of neoarsphenamine and have also found a similar immunizing action of an antimonial, melaminylphenylstibonic acid (Compound 122). The trypanocidal activity of this Sb compound has been reported by Friedheim and Berman (*Proc. Soc. exp. Biol. Med.*, 1946, 62, 131). Mayer and Brousseau, as in our earlier work, found only a temporary immunity conferred by their drug plus trypanosome injections, with a reappearance of trypanosomes in the blood after three days or later, and subsequent death of most of the infected animals. These workers have demonstrated a new point, namely, the transfer of passive immunity by injecting the serum of mice immunized by treatment of a progressed trypanosome infection into untreated, uninfected mice, followed by attempts to inoculate the latter.

Reiner and Leonard (*Arch. int. Pharm.*, 1932, 43, 10) demonstrated that *in vitro* treatment of *T. equiperdum* suspensions, in the presence of serum globulin, with arsenicals at drug concentrations failing to immobilize the parasites altered the virulence of the strain, so that rats inoculated with the treated trypanosomes were found to survive longer than controls inoculated with untreated trypanosomes.

The present writer has long held the view that trypanocidal drugs, even at concentrations failing to kill trypanosomes, can so alter the metabolism of the parasites as to make them more easily phagocytized, followed by an immunizing response of the host. That the immunization is only temporary may be due to a change in the character of the surviving parasites. Indeed, Friedheim and Berman note that the trypanosomes reappearing in mice after treatment with their Sb compound, followed by multiple reinfections, are atypical for mouse trypanosomiasis, the disease no longer showing the typical continuous, progressive blood-stream increase of parasites to death of the host, but rather an alteration to the chronic type infection seen in rabbits.

Finally, may we point out that no similar experiments seem to have been done to test whether such immune serum is obtainable after drug treatment of experimental treponeme infections. In view of the nature of the disease in rabbits (chiefly a tissue, rather than a blood-stream infection), this may be more difficult to demonstrate. But it would seem as if this could be tested *in vitro* by the action of rabbit sera on suspensions of treponemes from rabbit chancres. Such experiments might throw light on whether or not the Swift-Ellis subdural neurosyphilis therapy involves immunity factors, long a disputed point.

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### Thiophene-free Benzene

Since thiophene-free benzene is often required in the laboratory, especially in relatively small quantities, we wish to point out that the Raney nickel desulfurization reaction discovered by Bougault, Cattelain, and Chabrier (*Compt. rend.*, 1939, 208, 657; *Bull. soc. chim.*, 1940, 7, 781) provides an excellent method for its preparation.

In a typical experiment 100 ml. of benzene containing 1 per cent of thiophene was refluxed with 10 grams of Raney nickel prepared according to the method of Pavlic and Adkins (*J. Amer. chem. Soc.*, 1946, 68, 1471). After 15 minutes a sample of the benzene no longer gave the isatin-sulfuric acid color test for thiophene. An experiment using 5 grams of nickel apparently did not remove the last traces of thiophene. After removal of the nickel catalyst either by filtration or centrifugation, the benzene may be distilled, although for most purposes this seems unnecessary. It should be pointed out that the nickel residue gave a strong odor of hydrogen sulfide on acidification.

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### Pyridylmercuric Acetate as a Prophylactic in Fisheries Management

Among the compounds recommended by their manufacturers for the control of slime in pulp and paper mills are the organic mercurials. Because, in their use in pulp and paper mill water systems, certain amounts may find their way to the sewer and thence to the stream, we have been studying the toxic effect of this type of compound on fish and other aquatic organisms. To this end the compound, pyridylmercuric acetate, has recently been studied, and in the course of the work a number of incidental observations were made which indicate that, in great dilutions, this compound could be used profitably to control infections in fish hatcheries.

In the work the test fish were Lake Emerald shiners, *Notropis atherinoides* (Rafinesque). Apparently the fish had some infection when introduced into our test battery, for the control group of 17 fish had only 9 survivors (52 per cent) after a five-day test. On the other hand, a group of 28 fish in a solution of 0.05 ppm of the compound had 75 per cent survival; a group of 28 fish in 0.10 ppm, 78 per cent survival; and a group of 19 at 0.15 ppm, 96 per cent survival. Conditions of the tests were as follows: water temperature, 12° C.; pH, 7.38–7.72; and methyl orange alkalinity, 266 ppm.

We were not able to isolate or identify any causative organisms in this instance, but at various times we have had epizootics of *Cyclochaeta*, another external ciliate, and an internal gram-positive diplococcus.

Pyridylmercuric acetate is very toxic to bacteria and is toxic to fish in higher concentrations, but, with study, it might be adapted successfully to fish-hatchery conditions as a treatment for some of the troublesome fish diseases.

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### A View on Soviet Russia From Italy

I have read with the greatest interest the articles of Dr. Asmous (*Science*, 1946, 103, 281) and Dr. Gaposchkin (*Science*, 1946, 103, 404).

It is true that the Soviet Army saved the United Nations a great deal of trouble. So did the atomic bomb. Still, scientists of the U. S. A. agree that it is a weapon that one must not use.

It is a *fact* that the Soviet soldiers defeated the Nazi tyranny consciously. But, unfortunately, it is also a *fact* and not a feeling that Soviet tyranny, cruelty, and oppression are even larger, deeper, and worse than was the "horribile dictu" that was the Nazi tyranny.

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# *Book Reviews*

***Crop production and environment.*** R. O. Whyte. London: Faber and Faber, 1946. Pp. 372. (Illustrated.) 25/-.

Under this somewhat sweeping title Dr. Whyte, of the Imperial Agricultural Bureau, has given us a valuable presentation of many aspects of applied plant physiology. It would naturally be impossible to include within one book all the influences of environment on crop production. Mineral nutrition, soil science, and irrigation problems are omitted, and the book deals primarily with vernalization, photoperiodism, and the effects of temperature upon flowering.

An introductory chapter lays down briefly the types of phenomena to be considered, and the following two chapters discuss in more detail the early work of Klebs and of Gassner, the researches of Garner and Allard, and the more recent work of the Russian school. With these are included the experiments of Purvis and Gregory and of Murneek and the Missouri group. In spite of the author's pertinent remark that "too many generalizations have been made already" in this field, there is some tendency to overemphasize theories here at the expense of presentation of the facts. The effects of temperature and light on flowering, including an up-to-date description of Went's work on thermoperiodism, the reversal of vernalization by Gregory, and the effects of temperature and other conditions on photoperiodic response, are then presented in some detail. Two brief

but clear chapters deal with the role of hormones (real and postulated) in reproductive processes, and another with the work on breeding and selection for photoperiodic response. The remainder of the book takes up the various economic plants, including those of the tropics, and discusses the effects of light and temperature on flowering and also on hardiness and other characters.

A valuable feature of the book is its extensive presentation of the Russian literature. It is a pity, though perhaps unavoidable, that while sufficient description is given of the Russian experiments and results to understand them, the detail is still not enough to judge and appraise them critically. This is particularly true for the more controversial experiments of the Lysenko school, such as those purporting to show that vernalization can be inherited. Dr. Whyte seldom offers critical judgments of any of the work reported. The reviewer has been unable to find a clear answer to the question whether the yield of vernalized winter cereals is greater than that of appropriate strains of spring cereals planted under the same conditions in Russia. The lack of adoption of vernalization in most countries suggests that the answer is in the negative.

There are many fine, well-reproduced plates throughout the book. The inclusion of so much experimental material of different types will make the book of great value to plant scientists working both in the laboratory and in the field.

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***Practical malariology.*** **Paul F. Russell, Luther S. West, and Reginald D. Manwell. (Prepared under the auspices of the Division of Medical Sciences, National Research Council.) Philadelphia-London: W. B. Saunders, 1946. Pp. xix + 684. (Illustrated.) $8.00.**

Within this fully illustrated and beautifully printed volume is to be found practically all of the basic information needed for a reasonable comprehension of malaria and its problems. If the reader is a medical historian, he will find a well-balanced digest of historical data in the first chapter. If he desires a presentation of modern concepts on the classification, life cycle, morphology, and physiology of the malaria parasites of man and lower animals, and the preparation of blood films, tissue smears, and sections for diagnosis, he will gain a wealth of useful knowledge in Section I. If he is a medical entomologist, Section II and the Appendix will provide practically all of the necessary information for application of his skills to the anopheline mosquitoes as the biological vectors of malaria. If he is a physician, Section III will give him the essentials of pathogenesis, symptomatology, and treatment. If his interest is in epidemiology, let him examine Section IV, and if it is in public health, he will obtain a great variety of practical information on prophylaxis and control of malaria in Section V. Even the syphilologist will profit from the brief presentation on therapeutic malaria in Section VI. Each of the 29 chapters is provided with an adequate, up-to-date bibliography. The subject index is fairly complete, although it is more exhaustive in page references to the parasites, e.g. species of *Plasmodium*, and the vectors, e.g. species of *Anopheles*, than to clinical aspects. The comprehensive subjects of pathology, symptomatology, diagnosis, and treatment are omitted, but clinical terms, such as "anemia," "anoxia," "blackwater fever," "cachexia," and the important organs and tissues in which pathological changes occur, are specifically referred to. Likewise, all important antimalarials, including their synonyms and trade names, are indexed.

*Practical malariology* reflects the training and experience of the senior author and his colleagues. The emphasis placed on the morphology and biology of the parasites and their vectors constitutes their conviction that malaria is a laboratory and field problem, and that control of the disease depends to a greater extent on these phases of the subject than on clinical malaria in the individual patient. The same viewpoint is indicated in the very short treatment given to morbidity and mortality statistics. This attitude will probably be challenged by the clinician, who will rightly argue that suppressive atabrine therapy among military forces stationed in areas of high malariousness during World War II kept the troops free of clinical malaria. Yet it must be admitted that anti-anopheline measures were even more useful, since they prevented, or at least greatly reduced, exposure to the disease. Furthermore, the senior author's success in controlling malaria in the tropics, in peace and in war, supports his major thesis that malaria must be conquered in the field rather than in the clinic. The few criticisms which the reviewer has mentioned are indeed minor when balanced against the splendid contribution to the subject which Russell, West, and Manwell have made. They, their publishers, and their sponsors deserve high commendation for this timely volume.

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***Penicillin: its practical application.*** **Alexander Fleming. (Ed.) Philadelphia: Blakiston, 1946. Pp. x + 380. (Illustrated.) $7.00.**

Here is a good book on penicillin. Its practical application will be of interest to general practitioners as well as specialists who are interested in chemotherapy. The contents contain two sections: one, a general section of 6 chapters, dealing with the history, chemistry, pharmacy, pharmacology, bacteriology, and methods of administration; the other, a clinical section of 21 chapters, covering a wide variety of subjects, including a chapter for the general practitioner. One can find good general discussions of the subject of penicillin in almost all infections as they are treated in England. Some of the subjects are discussed in a very superficial fashion due to the lack of wide experience; this is especially true of the discussion of syphilis. One is inclined to question such statements as: "Inhalation of snuff and spray shortens the duration and diminishes complications" in acute rhinitis. On the whole, however, the book will serve as a very useful guide in using penicillin in the study of infections.

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